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NAVY OFFICER FORCE PLANNING FOR THE EARLY 21ST CENTURY

by

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An Advanced Research Project

A paper submitted to the Director of the Advanced Research Department in the Center for Naval Warfare Studies in partial satisfaction of the requirements for the Master of Arts Degree in National Security and Strategic Studies.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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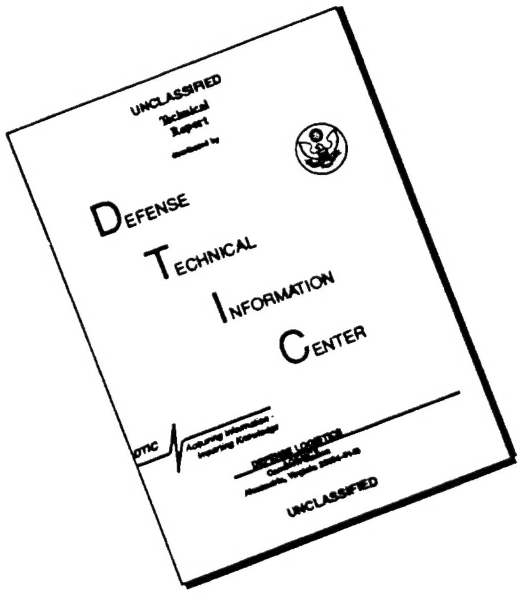

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15.Abstract: The United States Navy Bureau of Naval Personnel (BUPERS), Washington DC, is responsible for managing the professional development of thousands of officers. Officer management policy decisions primarily involves deciding how many officers to access, retain, promote, and separate each year. Good officer management policies ensure that the requisite number of officers by grade (rank) and community (specialty) will be available when needed to meet future force structure requirements. A mathematical forecasting model is presented for projecting current officer inventory over a ten-year planning horizon using officer management policies such as those listed above. The forecasting model has been implemented in an automated decision support system (DSS) designed to provide Navy personnel managers with a highly robust means of developing "good" officer professional management policies. Two performance criteria are used for policy development: officer management system efficiency measured in terms of deviations of forecasted inventory from officer goals, and total policy cost based on officer pay and allowances.

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LIST OF ABBREVIATIONS

AZ	Above the Zone promotion
BUPERS	Bureau of Naval Personnel
BZ	Below the Zone promotion
CAPT	Captain: Navy officer grade O-6
CDR	Commander: Navy officer grade O-5
DOPMA	Defense Officer Personnel Management Act
DSS	decision support system
ENS	Ensign: Navy officer grade O-1
FOS	fail officer select
IZ	In the Zone promotion
LCDR	Lieutenant Commander: Navy officer grade O-4
LT	Lieutenant: Navy officer grade O-3
LTJG	Lieutenant-Junior Grade: Navy officer grade O-2
RIF	reduction in force
SER	selective early retirement
YCS	year of commissioned service
YG	year group

EXECUTIVE SUMMARY

The United States Navy's Bureau of Naval Personnel (BUPERS), headquarted in Washington, DC, is responsible for managing the professional development of thousands of Navy officers. The development of officer management policies primarily involves deciding how many officers to access, retain, promote, and separate each year. Good officer management policies will help ensure that the requisite number of officers by grade (rank) and community (specialty) will be available when needed to meet future force structure requirements.

We begin with a brief summary of previous work related to the Navy officer management problem addressed here. This serves as a departure point for the development of a new extension to earlier transition rate forecasting models for military personnel strength. Currently, officer strength is aged from one year to the next by applying a single set of transition rates to current inventory. These rates reflect the cumulative attriting effects of all personnel management policies, and social and economic factors, as well, on a year group's worth of officers. This does not permit military personnel managers to isolate and explicitly model the effects of specific policies on future officer strength. The model presented here projects current officer inventory over a ten-year planning horizon using three sets of transition rates. These are promotion rates, continuation rates for promoted officers including officers selected for promotion, and continuation rates for officers not selected for promotion. Furthermore, personnel management policies for accessing, redistributing, and separating officers due to

reductions in force (RIF) and selective early retirements (SER) are also explicitly modeled. This provides Navy personnel managers with a level of detail that was not previously attainable when forecasting current officer strength into future periods using officer management policy. Two obvious benefits may be realized from this approach. First, it is expected that this method will improve the accuracy of forecasting military personnel strength. Second, it is hoped that this approach will help Navy personnel managers develop a sharper understanding of how changes to personnel policies, and other factors, may affect future military personnel end strength.

The model has been implemented in a prototype decision support system (DSS). Two performance measures are formulated for measuring the quality of forecasting results and for discriminating among competing feasible officer management policies. One is a measure of personnel management system efficiency that compares forecasted officer inventory with future force structure requirements for officers. The second measure computes the total cost for an officer management policy using cost factors for average annual pay and allowance costs per officer by grade (not including bonuses and special duty pay).

Computational experiments using the prototype decision support system reveal that the forecasting procedure developed is robust and computationally efficient. Preliminary results suggest that current Navy officer management policies may lead to sizable overstaffing of lieutenants and understaffing of commanders and captains during the planning period. Using the prototype DSS and a trial and error decision method, a revised officer management policy was obtained that substantially reduced the

overstaffing problem, and related pay and allowance costs. The paper concludes by summarizing notable contributions of the work to Navy officer force planning and identifying areas for future research.

CHAPTER 1

INTRODUCTION

The commissioned officer corps of the United States Navy is responsible for commanding, controlling, and leading Navy forces. Effective management of this vital resource is crucial to maintaining a high state of military readiness in Navy units. In turn, military readiness demands that operational billets be filled at required levels by officers of the appropriate ranks and specialties. Since the Desert War, downsizing and reduced defense spending have unquestionably affected the Navy's military readiness. For example, since the late 1980s, active duty Navy personnel and battle force ships have been reduced by 24% and 32%, respectively.[1] The Navy has responded to these changes by attempting to formulate and implement new policies for managing military personnel. However, these efforts have been at least partially impeded by major deployments of US military forces to Somalia, Kuwait, Haiti, Rwanda, and Bosnia. Meeting the high operational tempo of these military operations has disrupted the normal management of professional development, training, and education assignments for many officers.

The Bureau of Naval Personnel (BUPERS) is responsible for developing Navy officer management policies that meet the needs of our national military strategy. Such policies require that officers progress through a series of related education, training, and duty assignments as they grow and mature toward increasing levels of responsibility. One major objective of officer personnel management is to appropriately distribute

officer inventory by *grade* (rank), *community* (specialty), and *subspecialty* within a community to fill Navy billets according to the force structure needs of the service. Table 1 gives commissioned officer grades for the Navy and major officer communities.

Table 1.

Navy Officer Grades and Major Warfighting Communities

Grade	Rank	Abbreviation	Community
O-1	Ensign	ENS	Unrestricted Line (URL)
O-2	Lieutenant-Junior Grade	LTJG	Restricted Line (RL)
O-3	Lieutenant	LT	Staff
O-4	Lieutenant Commander	LCDR	
O-5	Commander	CDR	
O-6	Captain	CAPT	

Proper management of Navy officer inventory involves making and implementing officer management policy decisions for accessing, retaining, promoting, and separating officers, among others. Good policy decisions will ensure that requisite numbers of officers are available when needed to meet future force structure requirements. However, the task of determining appropriate personnel management policies for meeting the Navy's future force structure requirements is complicated by at least four factors. First, the temporal interdependence of officer professional development policy decisions makes policy decisions of future periods depend upon current decisions. Second, the effects of current policy decisions will not likely be known until years after such decisions are implemented. Third, current officer personnel management policies developed during previous decades for a larger, more stable force structure may not be suitable for

managing a significantly smaller force, or for dealing with force structure changes yet to come. Finally, the practices and analytical methods developed previously for analyzing officer management policies may no longer be valid having been developed during previous decades for a Navy force structure that is much different from today's.

This paper discusses the development of a decision support system (DSS) that provides Navy personnel managers with a desk-top tool for quickly, efficiently, and consistently evaluating officer professional development policies before their implementation. Work on this project was sponsored by the Advanced Research Department of the Naval War College, Newport, Rhode Island. The principal clients for decision support system development were the Bureau of Naval Personnel's Joint Officer Manning Branch (PERS 455), Officer Planning Branch (PERS 212), and Officer Promotions Branch (PERS 212F). The system has been implemented in a computer spreadsheet software environment compatible with *Microsoft Windows*™. It has been specifically designed for analyzing Navy personnel policies relating to accessions, promotions, retention, separations, and redistribution of officers between communities (specialties) over a ten-year planning horizon. However, the model does not account for subspecialties within a community.

The remainder of the paper is organized as follows. Chapter 2 briefly reviews previous work related to the problem presented here. Chapter 3 formulates a mathematical model of the Navy officer forecasting problem. Chapter 4 discusses development of a decision support system that implements the mathematical model of Chapter 3. Two performance measures are used for measuring the quality of forecasting

results and for discriminating among competing feasible officer management policies. One is a measure of personnel management system efficiency that compares forecasted officer inventory with future requirements for officers based on force structure. For modeling purposes, personnel requirements, commonly referred to as *officer programmed authorizations*, may be viewed as officer strength goals. The second is a measure of cost. Total cost for an officer management policy is computed by applying an average annual cost per officer, by grade, to the forecasted officer inventory. Chapter 5 presents experimental results from the decision support system. Chapter 6 gives conclusions and areas for future work.

CHAPTER 2

RELATED WORK

The literature documents the development of various personnel forecasting models applied to both civilian and military work forces. The reader is referred to Gass (1991) for a review of personnel planning models for projecting military personnel strength. The mathematical methods discussed by Gass include markov (transition rate) models, network flow models, and multiyear linear and goal programming models. Books discussing these topics include Bartholomew and Forbes (1979), Charnes, Cooper, and Neihuas (1978), and Grinold and Marshall (1977).

An application of personnel modeling methods to a real-world military problem is given by Gass, Collins, Meinhardt, Lemon, and Gillette (1988). The authors developed a model for projecting Army personnel strength over a twenty year planning horizon. The approach featured three subsystems applied sequentially in three phases. A markov chain model and a linear goal programming model were used in the second and third phases, respectively, to first project officer strength and then optimally distribute it according to force structure requirements.

Bres, Burns, Charnes, and Cooper (1980) applied similar models to planning officer accessions for the US Navy. The authors developed a markov model to project current inventory over a finite planning horizon. The model used transition rates, commonly referred to as *continuation rates*, to age officer strength from year to year. At

each stage of the problem, a goal programming model minimized differences between officer strength goals and the projected officer inventory.

Rao (1990) discussed a dynamic programming approach for determining optimal personnel recruitment policies. Rao's formulation of the problem minimized total system cost. The costs accounted for in the model included recruitment, overstaffing and understaffing, retention, and separation. Other practical applications, and notable extensions to personnel models, are given by Wijngaard (1983), Price (1978), Grinold (1976), Davies (1976), and Ritzman, Krajewski, and Showalter (1976).

Finally, computer simulations have also been used to gain insight into difficult personnel management policy problems. This approach permits some stochastic features, and the attendant uncertainty that typifies most real-world personnel management problems, to be incorporated in to the model albeit under strict modeling conditions and assumptions. For example, McGinnis, Kays, and Slaten (1994) demonstrated the use of computer simulation as a means of investigating alternatives for reengineering the Army's officer professional development system. Dale (1984) discussed the development of a computer simulation model for analyzing Army force structure personnel requirements.

CHAPTER 3

MATHEMATICAL FORMULATION OF THE PROBLEM

This chapter presents a mathematical model of the Navy officer forecasting problem. First, however, we will discuss practical aspects of Navy officer management essential to the development of the officer forecasting model.

3.1 DYNAMICS OF OFFICER STRENGTH MANAGEMENT

The subsections that follow briefly highlight important dynamics of officer strength management. These are generally the result of interaction between Congressional laws, Navy officer management policies, limits to defense spending, and efforts by Navy personnel managers to maintain the vitality of the officer corps. The reader is referred to Public Law 96-513, Department of Defense Officer Manpower Act (DOPMA), for details of the law that governs officer accessions, promotions, and separations. A concise, insightful historical assessment of DOPMA's effects on officer management and professional development is given by Rostker, Thie, Lacy, Kawata, and Purnell (1993). Additionally, potential alternatives for changing officer management and professional development are addressed by Thie and Brown (1994). The authors discuss their alternatives within the context of future changes to defense personnel requirements. For example, new threats to the interests and national security of the United States have emerged since the end of the Cold War that the US military must be prepared to confront.

New personal requirements are also being driven by recent changes to warfighting doctrine. Finally, there is a growing need for people with specialized skills to operate and maintain high technology military, computer, and information systems being integrated throughout the force.

OFFICER END STRENGTH AND YEAR GROUPS

As mentioned above, the United States Congress enacted the Department of Defense Officer Manpower Act (DOPMA) in 1980 to establish rules for all services governing how officers are accessed, promoted, retained, and separated. One landmark provision of DOPMA was the establishment of end strength ceilings for active duty officers in grades O-4 and above for each branch of service: Army, Navy, Air Force, and Marines. These were derived from historical relationships between each service's total enlisted personnel end strength and the number of officers needed for leading the force. Table 2 gives DOPMA end strengths for Navy officers in grades O-4 through O-6 as a function of the total number of commissioned officers on active duty.

Table 2.

DOPMA Navy Officer Strength and Distribution in Grade[2]

Total Commissioned Officer End Strength	Lieutenant Commander	Commander	Captain
45,000	9,124	5,776	2,501
48,000	9,565	5,384	2,602
51,000	10,006	6,190	2,702
54,000	10,447	6,398	2,803
57,000	10,888	6,606	2,904
60,000	11,329	6,813	3,005
63,000	11,770	7,020	3,106
66,000	12,211	7,227	3,206
70,000	12,799	7,504	3,341
90,000	15,739	8,886	4,013

The fiscal year that an officer enters active duty determines the officer's (initial) year group. Most officers who continue on active duty until retirement remain with the same year group throughout their careers. However, officers may be promoted out of one year group and into another if promoted one year, or more, before or after officers from their current (original) year group. These promotions, called below the zone and above the zone promotions, are explained next.

OFFICER PROMOTIONS, PROMOTION RATES, AND FLOW POINTS

Officer promotion policy is a very important component of Navy officer management. Promotion policy consists of three elements: promotion zones, the number of officers promoted from each zone, and the timing of the promotion.

DOPMA addresses three types of promotion zones: *in the zone* (IZ), *below the zone* (BZ), and *above the zone* (AZ). In most cases, officer promotions are managed by year group cohort. Eligibility for consideration for promotion is based on a minimum number of years in grade, referred to as *time in grade*. The timing of promotion opportunities may also be measured in years of commissioned service (YCS). This is expressed as the difference between the current fiscal year and the officer's year group. For example, if the current year is 1996, then a commissioned officer who began active duty in 1974 has 22 years of commissioned service.

Officers promoted in the zone, called "due course" promotions, remain with the same year group throughout their careers. However, below the zone or above the zone promotions cause officers to change year groups. A one year below the zone promotion moves an officer into the year group one year ahead (in time) of the officer's current year

group. For example, if the officer from year group 1974 had been selected one year below the zone to O-4, then the officer would join year group 1973 for promotion purposes. Similarly, one year below the zone promotions to O-5 and O-6 would jump the officer ahead two year groups into year group 1971. The implication being that officers selected below the zone must compete for future promotions with officers who have one, or more, years worth of assignments and experiences. Similarly, a one year above the zone promotion at any grade moves the officer one year behind (in time) the officer's previous year group into year group 1975. Table 3 summarizes DOPMA promotion guidelines by grade

Table 3.

DOPMA Promotion Guidelines

Promotion to Grade	DOPMA Promotion Rate Guidelines	Promotion timing (flow point) for IZ ("due course") officers (YCS)	Promotion zone opportunity by grade
O-2	100% if "fully qualified"	2 years	IZ
O-3	95%	3.5 years	IZ
O-4	80%	10 ± 1 years	BZ, IZ, AZ
O-5	70%	16 ± 1 years	BZ, IZ, AZ
O-6	50%	22 ± 1 years	BZ, IZ, AZ

Column 2 gives the promotion rate guidelines for each grade of column 1. Column 3 shows the timing for "due course" officer promotions by years of commissioned service, also known as *promotion flow points*. The difference between the promotion flow points of any two consecutive grades, minus one year, gives (approximately) the minimum time in grade requirements before being eligible for consideration for promotion to the next

grade. Finally, column 4 gives officer promotion opportunity as measured by the number of times, by grade, that Navy officers are normally considered for promotion.

Each year, Congress establishes the military personnel end strength for each service. The services must, in turn, meet the congressionally mandated military end strength on the last day of the fiscal year. In so doing, the services must meet the DOPMA grade ceilings for officers in grades above O-3 as well. When the services are at or near the officer ceilings authorized by DOPMA, then the number of vacancies in the next higher grade generally determines officer promotion opportunity. In these instances, the promotion rate for a grade is computed as the total number of officers selected for promotion from all three zones, that is, BZ, IZ, and AZ, divided by the number of in the zone officers eligible for promotion. We also note that limits to defense spending influence the number of officers promoted and the distribution of promotions throughout a fiscal year. Obviously, reduced spending may lead to fewer officer promotions, or to delaying promotions until later in the fiscal year.

OFFICER CONTINUATION RATES

A continuation rate is defined as the rate at which officers in a given year group continue to serve from one year to the next. The Navy uses these rates to estimate the future strength and shape of the force. The types of Navy officer end strength forecasts include total officer end strength, officer community (specialty), subspecialty, grade, and year group. Continuation rates presently used for forecasting are computed from historical data by comparing active duty end strength at the end of consecutive fiscal

years. This determines the number who stay from year to year. The ratio of the two end strengths gives the rate at which the officers continued to stay.

Work related to the Navy officer management problem reviewed above serves as a point of departure for a new extension to previously developed transition rate models for forecasting military personnel strength. Currently, officer strength is aged from one year to the next by applying a single set of continuation (transition) rates to current inventory. These rates reflect the cumulative attrition of all personnel management policies, and social and economic factors as well, on a year group's worth of officers. This does not permit military personnel managers to isolate and explicitly model the effects of specific policies on future officer strength. The model presented here projects current officer inventory over a ten-year planning horizon using three sets of transition rates. These are promotion rates, continuation rates for promoted officers and officers selected for promotion, and continuation rates for officers considered but not selected for promotion. Furthermore, personnel management policies for accessing, redistributing, and separating officers due to reductions in force (RIF) and selective early retirements (SER) are explicitly modeled as direct losses. This provides Navy personnel managers with a level of detail in modeling officer management policies and forecasting current officer strength into future periods that was not previously attainable. It is also expected that this approach will improve the accuracy of personnel forecasting methods used by Navy personnel managers. Finally, it is hoped that this approach will help personnel managers develop a sharper understanding of how personnel policy changes may influence future personnel end strength.

ESTIMATING THE SIZE OF THE OFFICER FORECASTING PROBLEM

The appropriate choice of an approach for modeling military personnel management problems depends upon a number of factors. These include the needs of the decision maker, the context of the problem and how its defined, as well as the assumptions needed to model the problem. Collectively, these factors complicate the tasks of choosing, developing, and implementing a mathematical model for the real-world military personnel management problem.

One major obstacle, among others, to applying mathematical forecasting methods to the Navy's officer management problem is the size of the problem. For example, a markov model for projecting officer strength one year into the future requires seven $9x33$ matrices for officer inventories, promotion rates, continuation rates, and inventory adjustments. The size of each matrix reflects six officer grades, thirty year groups of officers, plus columns and rows for headings and totals, as necessary. Ten years worth of matrices generate approximately 17,000 cells for storing data, forecasting formulas, and computational results.

Formulating an integer programming model for one year of the Navy's officer management problem requires indexing at least three officer communities (unrestricted line (URL), restricted line (RL), and staff); six officer grades (O-1 through O-6 (see Table 1)); 30 officer year groups (YG); 180 officer continuation rates; and 18 officer promotion rates. This generates approximately 1.75 million integer variables ($3x6x30x180x18$) for a one-period problem.

Clearly, substantial time, funds, and effort may be needed to build and maintain such models. Furthermore, applying these modeling methods to a real-world problem generally requires specialized computer software and mathematical skills, and a thorough understanding of the problem. Generally speaking, most military personnel managers will not likely possess the prerequisite skills and qualifications for doing this sort of work. These issues must be given serious consideration before model development is undertaken, and in some cases may prohibit the development of some types of models.

3.2 MATHEMATICAL NOTATION AND MODEL FORMULATION

t: Fiscal year of the planning horizon, $t \in \{1,2,...,T\}$.

i: Officer grade (rank), $i \in \{1,2,...,I\}$.

j: Officer year group (YG)), $j \in \{1,2,...,J\}$. An officer year group is generally defined as the fiscal year that the officer began active duty. See 3.1 for details.

k: Officer community (specialty), $k \in \{1,2,...,K\}$.

$o_{ijk}(t)$: Officer end strength for grade i, officer year group j, and officer community k as determined on the last day of fiscal year t.

$\overline{O}_{ik}(t)$: Officer end strength upper bounds established by Congressional law[3] and Navy policy for grade i and officer community k in fiscal year t.

$\underline{o}_{ik}(t)$: Officer strength (lower bound) goals determined by Headquarters, Department of the Navy for grade i and officer community k in fiscal year t. These goals represent (soft) lower bounds for officer strength, by grade, derived from force structure requirements for the minimal force staffing levels needed to maintain military readiness of the Navy.

$p_{ijk}(t)$: Promotion rate for "due course" officers from community k and year group j selected *in the zone* (IZ). This promotion advances them from grade i to grade $i+1$ during fiscal year t, where $0 \le p_{ijk}(t) \le 1$.

$p_{i,j+1,k}(t)$: Promotion rate for officers from officer community k selected *below the zone* (BZ). This promotion simultaneously advances officers from grade i to grade $i+1$ and moves them from year group j to year group $j+1$ during fiscal year t, where $0 \le p_{i,j+1,k}(t) \le 1$.

$p_{i,j-1,k}(t)$: Promotion rate for officers from officer community k selected *above the zone* (AZ). This promotion simultaneously advances officers from grade i to grade $i+1$ and moves them from year group j to year group $j-1$ during fiscal year t, where $0 \le p_{i,j-1,k}(t) \le 1$.

$\alpha_{ijk}(t)$: indicator variable for above the zone promotion, where $\alpha_{ijk}(t) \in \{0, 1\}$. $\alpha_{ijk}(t)$ is one when officers are promoted above the zone from grade i to grade $i+1$ in officer community k during fiscal year t, and zero otherwise.

$\beta_{ijk}(t)$: indicator variable for below the zone promotion, where $\beta_{ijk}(t) \in \{0, 1\}$. $\beta_{ijk}(t)$ is one when officers are promoted below the zone from grade i to grade $i+1$ in officer community k during fiscal year t, and zero otherwise.

$\chi_{ijk}(t)$: indicator variable for in the zone promotion, where $\chi_{ijk}(t) \in \{0, 1\}$. $\chi_{ijk}(t)$ is one when officers are promoted in the zone from grade i to grade $i+1$ in officer community k during fiscal year t, and zero otherwise.

$q_{ijk}(t)$: Rate at which officers from community k and year group j are considered but <u>not selected</u> for promotion from grade i to grade $i+1$ during fiscal year t, where $q_{ijk}(t) = 1 - p_{ijk}(t)$. Similar complements exist for below the zone and above the zone promotion rates (see above).

$\varepsilon_{ik}(t)$: indicator variable for aging a year group of "successful" officers (i.e., promotable or promoted officers), where $\varepsilon_{ik}(t) \in \{0, 1\}$. $\varepsilon_{ik}(t)$ is one when the last (most recent) promotion opportunity resulted in these officers being promoted from grade i to grade $i+1$ in officer community k during fiscal year t, and zero otherwise.

$\phi_{ik}(t)$: indicator variable for aging a year group of "unsuccessful" officers (i.e., officers considered but not selected for promotion), where $\phi_{ik}(t) \in \{0, 1\}$. $\phi_{ik}(t)$ is one when the last (most recent) promotion opportunity resulted in these officers being passed over for promotion (i.e., fail officer select) from grade i to grade $i+1$ in officer community k during fiscal year t, and zero otherwise.

$C^{P}_{ijk}(t)$: Continuation rate for officers in grade i, year group j, and in officer community k during fiscal year t, who were <u>selected</u> for promotion when last (most recently) considered, where $0 \le C^{P}_{ijk}(t) \le 1$.

$C^{Q}_{ijk}(t)$: Continuation rate for officers in grade i and year group j from community k in fiscal year t, who were considered but <u>not selected</u> for promotion from grade i to grade $i+1$ when last (most recently) considered, where $0 \le C^{Q}_{ijk}(t) \le 1$.

$a_{ijk}(t)$: Number of officers gained by year group j, grade i, and community k as direct inputs during fiscal year t. Direct officer inputs include accessions and officers redesignated into community k from some other community.

$s_{ijk}(t)$: Number of officers lost from grade i, officer year group j, and officer community k during fiscal year t. Direct losses include officer separations due to reduction in force (RIF) or selective early retirement (SER). All other officer losses such as promotion passover, referred to as *fail officer select* (FOS), resignation, or retirement are modeled using historical continuation rates (see $C^{P}_{ijk}(t)$ and $C^{Q}_{ijk}(t)$ above).

MODELING CONSTRAINTS AND RELATIONS

$$0 \le \underline{o}_{ik}(t) \le \overline{O}_{ik}(t) \quad \forall \ (i,k,t) : \text{Officer strength feasibility constraint.} \qquad (1)$$

$$0 \le \sum_{j=1}^{J} a_{ijk}(t) \le \overline{O}_{ik}(t) \quad \forall \ (i,j,k,t) : \text{Officer input constraint.} \qquad (2)$$

$$0 \leq \sum_{j=1}^{J} s_{ijk}(t) \leq \underline{o}_{ik}(t) \; \forall \; (i,j,k,t) : \text{Officer separation constraint.} \qquad (3)$$

STAGES

Stages of the Navy officer forecasting problem are denoted by fiscal year t. Fiscal years begin on the first day of October in a given year and end on the last day of September in the following year. The planning horizon consists of T discrete, identical fiscal years, where $t \in \{1,2,...,T\}$.

STATE TRANSITION EQUATION

The state of the Navy officer personnel system evolves from stage t to stage $t+1$ according to an officer end strength balance equation applied within a community by grade and year group. Officer end strength for fiscal year $t+1$ is computed by aging officer end strength from fiscal year t, plus officer gains minus officer losses that occur during fiscal year $t+1$. In words, the state transition equation is expressed as follows:

$$\begin{bmatrix}\text{End Strength}\\ \text{Year (t + 1)}\end{bmatrix} = \begin{bmatrix}\text{Direct Gains}\\ \text{during Yr (t + 1)}\end{bmatrix} + \begin{bmatrix}\text{Promotion Gains}\\ \text{during Yr (t + 1)}\end{bmatrix} - \begin{bmatrix}\text{Direct Losses}\\ \text{during Yr (t + 1)}\end{bmatrix}$$

$$+ \left[\begin{bmatrix}\text{End Strength}\\ \text{Year (t)}\end{bmatrix} - \begin{bmatrix}\text{Promotion Losses}\\ \text{from End Strength (t)}\\ \text{during Yr (t + 1)}\end{bmatrix} \right] x \begin{cases}\text{C - Rates for } \textit{promoted} \text{ officers}\\ \text{or}\\ \text{C - Rates for } \overline{\textit{promoted}} \text{ officers}\end{cases}$$

Two types of officer gains are considered: direct gains from accessions and the redistribution of officers, and gains due to promotion from grade $i-1$ to i, if these occur.

Three types of officer losses are considered: direct losses due to RIF and SER separations, promotion losses to the previous years' officer end strength, and losses due to natural attrition to the previous years' officer end strength. Note that promotion losses, if they occur, are applied to officer end strength for year t before the officer end strength from fiscal year t is aged using separate continuation rates for successful officers (i.e., those promoted) and for unsuccessful officers (i.e., officers who were considered but not selected for promotion as denoted by the complement, $\overline{promoted}$). In mathematical notation, the officer end strength state transition equation is given by:

$$o_{ijk}(t+1) = f\left[\, t,\ o_{ijk}(t),\ a_{ijk}(t+1),\ s_{ijk}(t+1),\ p_{i,j-1,k}(t+1),\ p_{ijk}(t+1),\ p_{i,j+1,k}(t+1) \,\right]$$

$$= a_{ijk}(t+1) + \left[\begin{array}{l} \beta_{ijk}(t)\ o_{i-1,j+1,k}(t)\ p_{i-1,j,k}(t+1)\ C^{P}_{i-1,j,k}(t+1) + \\ \chi_{ijk}(t)\ o_{i-1,j,k}(t)\ p_{i-1,j,k}(t+1)\ C^{P}_{i-1,j,k}(t+1) + \\ \alpha_{ijk}(t)\ o_{i-1,j-1,k}(t)\ p_{i-1,j,k}(t+1)\ C^{P}_{i-1,j,k}(t+1) \end{array}\right] - s_{ijk}(t+1) \qquad (4)$$

$$+ \left[\, o_{ijk}(t) - \left(\begin{array}{l} \beta_{ijk}(t)\ o_{i,j+1,k}(t)\ p_{ijk}(t+1)\ C^{P}_{ijk}(t+1) + \\ \chi_{ijk}(t)\ o_{i,j,k}(t)\ p_{ijk}(t+1)\ C^{P}_{ijk}(t+1) + \\ \alpha_{ijk}(t)\ o_{i,j-1,k}(t)\ p_{ijk}(t+1)\ C^{P}_{ijk}(t+1) \end{array}\right) \,\right] x$$

$$\left\{\begin{array}{l} \delta_{ijk}(t)\ p_{ijk}(t+1)\ C^{P}_{ijk}(t+1) \\ \varepsilon_{ijk}(t)\ q_{ijk}(t+1)\ C^{Q}_{ijk}(t+1) \end{array}\right.$$

$f[\ *\ ]$ is explicitly defined as an equivalent representation of the right hand side of (4).

OFFICER MANAGEMENT DECISIONS AND SCHEDULING

We assume for this study that in any fiscal year $t \in \{1, 2,..., T\}$, officer promotion rate $p_{ijk}(t)$, accession $a_{ijk}(t)$, and separation $s_{ijk}(t)$ decisions are made at the beginning of fiscal year t and implemented sometime before the end of the year. We require that $a_{ijk}(t) \in \Omega$ and $s_{ijk}(t) \in \Psi$. Ω and Ψ are decision spaces consisting of bounded integer sets specified by the officer input and the officer separation constraints, respectively (see (2) and (3) above). The subsets of feasible decisions to take at each stage t are denoted by $\mathrm{A}\left[t,\, o_{ijk}(t)\right] \subset \Omega$ and $\mathrm{S}\left[t,\, o_{ijk}(t)\right] \subset \Psi$. This notation indicates that decision elements belonging to these two subspaces depend upon both the stage t and the state $o_{ijk}(t)$ of the officer personnel management system. For officer community $k \in \{1,2,...,K\}$, a sequence of officer management policy decisions, denoted by π, is represented by

$$\pi = \left\{ \begin{array}{l} p_{11k}(1),\, p_{11k}(2),...,p_{ijk}(t),...,p_{IJk}(T); \\ a_{11k}(1),\, a_{11k}(2),...,a_{ijk}(t),...,a_{IJk}(T); \\ s_{11k}(1),\; s_{11k}(2),...,s_{ijk}(t),...,s_{IJk}(T) \end{array} \right\}. \qquad (5)$$

The set of feasible sequences Π consists of all solutions satisfying constraints (1) through (3) above.

OBJECTIVE FUNCTION

Here we are interested in obtaining officer management policies that satisfy Navy force structure requirements in each year of the planning horizon with the requisite

number of Navy officers by grade. It is expected that such policies will also simultaneously minimize military personnel costs for pay and allowances. As mentioned above, total cost serves as a second means for measuring the quality of officer management policies specified by (5).

Given constraints (1) through (3) above, plus an initial state $o_{ijk}(0)$, then for each sequence of feasible decisions $\pi \in \Pi$ there is a corresponding value N_π based on deviations from the officer strength goals that provides a measure to be minimized. This is given by

$$M_\pi\left[0, o_{ijk}(0)\right] = \sum_{t=1}^{T} \sum_{i=1}^{I} \sum_{j=1}^{J} \left\| o_{ijk}(t) - \underline{o}_{ijk}(t) \right\|, \tag{6}$$

where the operator $\| * \|$ denotes the absolute value of the differences between current officer strengths and the officer strength goals. This formulation minimizes officer strength deviations from strength goals for each grade; henceforth referred to as over and understaffing. Using an exact solution method to minimize deviations, then the optimal sequence of decisions π^* is the one that minimizes (6) for a fixed initial state as denoted by:

$$M_{\pi^*} = \min_{\pi \in \Pi} M_\pi . \tag{7}$$

A second objective function that minimizes officer strength costs associated with each officer management policy $\pi \in \Pi$ is given by:

$$N_{\pi}\left[0, o_{ijk}(0)\right] = \sum_{t=1}^{T} \sum_{i=1}^{I} \sum_{j=1}^{J} \text{pos}\left\{ b_{ijk}(t)\left[o_{ijk}(t) - \underline{o}_{ijk}(t)\right]\right\}. \qquad (8)$$

The notation pos { * } denotes that only positive differences from (6) are used to compute (8) reflecting overstaffing costs only. The cost factors $b_{ijk}(t)$ represent average annual pay and allowance costs per officer by grade and year (see Appendix D), less bonus and specialty pay. In this case, the problem is to determine the officer management policy and corresponding officer strengths for each year that minimize (8) as denoted by

$$N_{\pi^*} = \min_{\pi \in \Pi} N_{\pi}. \qquad (9)$$

OFFICER FORECASTING PROGRAM

The steps for forecasting Navy officer inventory are outlined below. In matrix notation, officer inventory $\mathbf{o}_{ijk}(t)$ represents the number of officers on active duty at the end of the fiscal year by year group and grade.

STEP 1. For officer community k, grade i, and year group j, compute transition officer inventory (TI) matrices:

$$\mathbf{TI}_{ijk}^{P1}(t+1) = \mathbf{o}_{ijk}(t)\, \mathbf{p}_{ijk}(t+1)$$

$$\mathbf{TI}_{ijk}^{Q1}(t+1) = \mathbf{o}_{ijk}(t)\, \mathbf{q}_{ijk}(t+1),$$

where $\mathbf{q}_{ijk}(t) = \mathbf{1} - \mathbf{p}_{ijk}(t)$. $\mathbf{TI}_{ijk}^{P1}(t+1)$ is a matrix of officers selected for promotion plus officers previously promoted as denoted by the superscript *P1*. The second officer transition inventory matrix $\mathbf{TI}_{ijk}^{Q1}(t+1)$ consists of all officers considered but not selected for promotion as denoted by the superscript *Q1*.

STEP 2. For officer community *k*, grade *i*, and year group *j*, compute a second pair of transition officer inventory (TI) matrices:

$$\mathbf{TI}_{ijk}^{P2}(t+1) = \mathbf{TI}_{ijk}^{P1}(t+1)\ \mathbf{C}_{ijk}^{P}(t+1),$$

$$\mathbf{TI}_{ijk}^{Q2}(t+1) = \mathbf{TI}_{ijk}^{Q1}(t+1)\ \mathbf{C}_{ijk}^{Q}(t+1).$$

$\mathbf{C}_{ijk}^{P}(t+1)$ and $\mathbf{C}_{ijk}^{Q}(t+1)$ are matrices of rates at which promoted officers and officers not selected for promotion are expected to continue to serve, respectively.

STEP 3. Compute officer inventory for year *t+1* by adding the two transition inventory matrices from STEP 2. In mathematical terms this is given by

$$\mathbf{o}_{ijk}(t+1) = \mathbf{TI}_{ijk}^{P2}(t+1) + \mathbf{TI}_{ijk}^{Q2}(t+1).$$

DECISION PROCESSES FOR POLICY IMPROVEMENT

Using the model formulated above, and an initial state specifying accession, promotion, and retention policies, we forecast current Navy officer inventory by grade and year group (YG) over a ten-year planning horizon. The forecasted officer inventory is then compared with future requirements for Navy officers by grade *i* and fiscal year *t*.

The officer force structure requirements used here, referred to as *officer programmed authorizations*, were obtained from the Department of the Navy's Officer Military Personnel Navy (MPN) Programmed Authorizations for Fiscal Year 1995-2000. For this study, officer programmed authorizations for fiscal year 2000 were also used for fiscal years 2001 through 2005. This reflects a steady state assumption for Navy force structure during these years. An *officer strength shortfall* occurs when the programmed authorization in any grade and year of the planning horizon exceeds forecasted officer inventory. Feasible officer professional development policies are obtained by iteratively revising the current officer management policies until the officer shortfall is corrected.

Discussions with Navy personnel managers and experts from the Navy personnel community revealed that they generally rely on heuristic methods, rules, and personnel experience and judgment for generating and evaluating "good" officer management polices. In many cases, the procedures used evolved over previous years when officer strength goals were relatively stable and there were few changes to Navy force structure. Unfortunately, severe shortcomings exist with these methods. Revising management policies for accessions, promotions, and separations is essentially done by trial-and-error. Furthermore, it is possible to generate different officer management policies for the same initial state and officer programmed authorizations. Third, no systematic methods exist for making comparative analyses to appraise the quality of competing feasible officer management policies. Finally, the interdependence of the problem's decision variables (e.g., officer inputs, promotions, and separations) causes decisions made for the current period to impact future decision epochs. This complicates the policy decision process

and makes generating year-by-year officer management policies a tedious, time-consuming task.

The limited time available (approximately three months) for completing the advanced research project was not sufficient to include the development of an improved officer management policy decision process. Therefore, the procedures used in the decision support system presented in Chapter 4 for iteratively improving a Navy officer management policy over the planning horizon are similar to the methods currently used in practice. It is suggested that future work focus on the development and implementation of an automated exact method or a precise heuristic procedure for generating Navy officer management policies (see Chapter 6).

CHAPTER 4

DECISION SUPPORT SYSTEM DEVELOPMENT

The complexities of the Navy's officer management system create numerous practical decision problems for personnel managers. For reasons discussed in Chapter 3, good solutions to officer management problems may not be obvious to decision makers. This is due, in large part, to competing, real-world objectives that simultaneously attempt to reduce force structure and defense spending, and maximize military readiness. The need to evaluate the long term impact of officer management decisions within the context of officer management constraints imposed by law and policy complicates analysis of these issues. A prototype decision support system (DSS) has been developed in an effort to help Navy personnel managers make better officer management and policy decisions. The system automates the steps to forecast Navy officer inventory over a ten-year planning horizon. It also partially automates heuristic methods similar to those currently used in practice by Navy personnel managers for generating and revising officer management polices (see Chapter 3).

4.1 POTENTIAL USES FOR THE DECISION SUPPORT SYSTEM

Navy force planners are responsible for properly manning the force. This involves comparing forecasted officer strength with programmed authorizations derived from officer requirements based on future Navy force structure. The determination of officer

programmed authorizations generates annual accession targets for ensigns that, in turn, drive future promotion, retention, and separation policies for officers of all grades. Recent events such as force structure downsizing, realignment and closure of military bases, and defense spending cuts have complicated the force planning and officer management processes. The prototype decision support system makes it possible for branch heads to analyze the impact of these events on their area of interest. It also permits them to perform "what if" analysis in terms of identifying "good" officer management policies for meeting future requirements for Navy officers. For example, demand for Navy officers is determined by programmed authorizations that represent force structure personnel requirements. The prototype decision support system forecasts officer strength based on officer accessions and other officer management policies. These are model parameters and easily changed by the system user.

Navy personnel managers acquire and distribute Navy officers by grade and community (specialty) to meet the force structure requirements of the Navy. The decision support system can help personnel managers predict officer shortfalls by grade and warfighting community. Annual cost estimates are also computed for officer pay and allowances that may be useful for justifying budget estimates to Department of the Navy. Finally, the system can support studies and planning for special contingencies such as mobilization and force structure downsizing via redistribution of officers, accessions, reductions in force (RIF), and selective early retirement (SER).

4.2 DECISION SUPPORT SYSTEM ARCHITECTURE

Development of the decision support system was accomplished through three sequential, overlapping tasks.

1. Functional description of the system.
2. Preliminary design of system architecture and system modules.
3. Development of a system prototype.

Task 1 identified the primary functions of the decision support system. In Task 2, the system architecture was represented graphically through a set of interconnected modules. Figure 1 illustrates the DSS architecture and system modules.

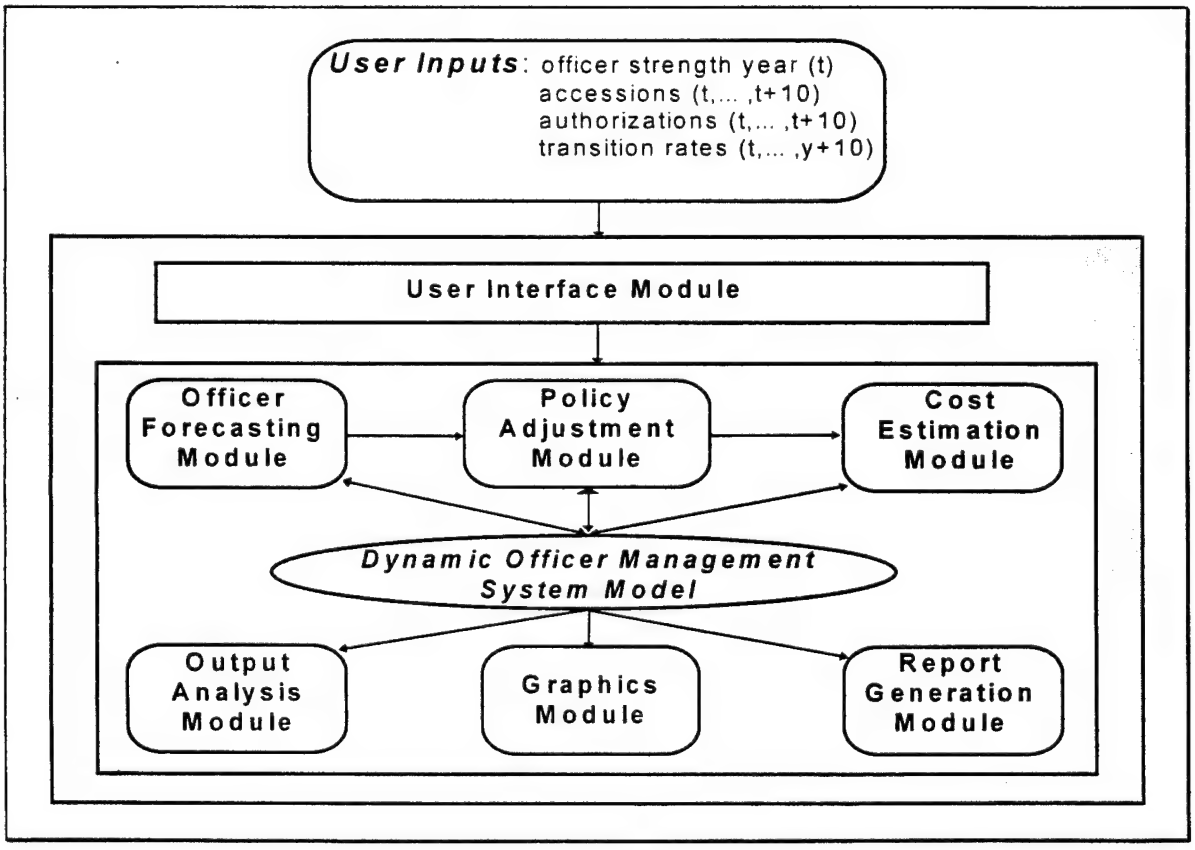

Figure 1. Decision Support System Architecture and System Modules

The directed arrows depict the flow of data and the dynamic links between the system modules. The modules embody the functional requirements of the officer management system identified in Task 1. System design primarily addressed four major issues.

1. System and module functionality.
2. System and module data exchange requirements.
3. Module procedures, logic, and rules for performing scheduling operations.
4. Data generation, storage, and retrieval requirements.

In Task 3, the system modules were implemented in *LOTUS 1-2-3 for Windows*. The spreadsheet environment is ideal for accomplishing the thousands of repetitive calculations required to forecast officer strength. Spreadsheet macro programs perform the forecasting routines, procedures, and rules for controlling the flow of data between modules. The spreadsheet also features built-in tools for statistical analysis of forecasting output.

Once the system modules were performing as expected, linkages were established between them providing dynamic data exchange between the modules. Figure 2 shows the layout of the spreadsheet model (see below) and gives cell references that locate the modules within the spreadsheet. The left most column shows the locations for the user interface menu; the user input matrices for accessions, officer authorizations, and cost factors; spreadsheet macros; a range table of all named cells within the spreadsheet; and system documentation.

The alternating groups of shaded and clear cells associate the matrices for aging officer end strength from one year to the next. The process generally works from left to

right, and then down, following the forecasting programming steps outlined at the end of 3.2 and according to the state transition equation (4). First, officer end strength for year *t* (*Inv t*) is multiplied by promotion rates (*P-rates*) to generate a transition inventory (*TI*). The transition inventory is, in turn, multiplied by continuation rates (*C-rates*) to yield officer end strength for year *t+1* (*Inv t+1*) (not accounting for direct losses). Next, reduction in force (RIF) and selective early retirement (SER) losses are made through the *Adjust* matrix that produces the adjusted officer end strength for fiscal year *t+1* (*Adj Inv t+1*).

module	cell	matrix	cell	matrix	cell	matrix	cell	matrix	cell
user menu	A1	Inv 0	R1	P-rates 1	AB1	TI 1	AK1	C-rates 1	AU1
		Inv 1	R38	Adjust 1	AB38				
accessions	A27	Adj Inv 1	R74	P-rates 2	AB74	TI 2	AK74	C-rates 2	AU74
		Inv 2	R111	Adjust 2	AB111				
officer authorization	A46	Adj Inv 2	R147	P-rates 3	AB147	TI 3	AK147	C-rates 3	AU147
		Inv 3	R184	Adjust 3	AB184				
cost factors	A62	Adj Inv 3	R220	P-rates 4	AB220	TI 4	AK220	C-rates 4	AU220
		Inv 4	R257	Adjust 4	AB257				
macros	A105	Adj Inv 4	R293	P-rates 5	AB293	TI 5	AK293	C-rates 5	AU293
		Inv 5	R330	Adjust 5	AB330				
range table	A247	Adj Inv 5	R366	P-rates 6	AB366	TI 6	AK366	C-rates 6	AU366
		Inv 6	R403	Adjust 6	AB403				
system document	A357	Adj Inv 6	R439	P-rates 7	AB439	TI 7	AK439	C-rates 7	AU439
		Inv 7	R476	Adjust 7	AB476				
		Adj Inv 7	R512	P-rates 8	AB512	TI 8	AK512	C-rates 8	AU512
		Inv 8	R549	Adjust 8	AB549				
		Adj Inv 8	R585	P-rates 9	AB585	TI 9	AK585	C-rates 9	AU585
		Inv 9	R622	Adjust 9	AB622				
		Adj Inv 9	R658	P-rates 10	AB658	TI 10	AK658	C-rates 10	AU658
		Inv 10	R695	Adjust 10	AB695				
		Adj Inv 10	R731						

Figure 2. Layout of the Navy Officer Forecasting Model

4.3 DESCRIPTION OF THE DECISION SUPPORT SYSTEM MODULES

As shown in Figure 1, the mathematical model of the officer management system presented in Chapter 3 serves as the centerpiece of the prototype DSS. The descriptive module names indicate the primary functionality of each module. A brief description of each follows below.

The *Officer Forecasting Module* projects current officer inventory one year at a time for ten years. The module uses officer management rules, constraints, and user-inputs describing the initial state of the officer management system to forecast officer strength.

The *Policy Adjustment Module* allows the system user to make adjustments to officer management policies in each year of the planning horizon. These include the redistribution of officers between communities, and losses due to officer separation actions. The user interacts with the computer spreadsheet model to generate good officer management policies given the initial state of the system.

The *Numerical Analysis Module* analyzes forecasting data, computes objective function values and related statistics, and summarizes forecasting information. The *Graphical Analysis Module* graphs forecasting information and statistics. The *Report Generation Module* produces numerical and graphical scheduling output tailored to the decision making needs of Navy personnel managers. Chapter 5 gives examples of numerical and graphical output. See Appendix F for output from an illustrative scheduling session with the decision support system.

The *Cost Estimation Module* estimates the total cost for an officer management policy using cost factors for pay and allowances and forecasted officer strength. Cost factors are given in Appendix D. Cost measures currently computed by the system include the following

- Total (ten year) and annual costs for an officer management policy. Total program costs are estimated for the ten-year planning horizon and for each forecasting year as well.

- Total and annual officer management program cost variance. The cost variance for the officer management program represents cost differences between officer management policies from any two consecutive years of the planning horizon. The decision support system expresses cost variances in constant dollars and also as percentage differences in personnel costs from year-to-year. These differences reflect changes to officer end strength resulting from force structure changes or officer management policy changes as explained above. Comparisons of annual cost variances are made by total program cost and annual costs.

Cost factors for this study were provided by the Office of the Director of Military Personnel Management, Headquarters, Department of the Army, Washington, DC. All other modeling data were provided by the Bureau of Naval Personnel, Washington, DC. These included Navy promotion rates, continuation rates, accessions, officer inventory, and officer programmed authorizations. Transition rates used for forecasting officer

strength were either computed from the data provided in the Appendices, or were elicited from consultation with subject matter experts from the Analysis, Research, and Development Branch, PERS 222F1, and the Officer Promotions Branch, PERS 212F.

CHAPTER 5

RESULTS

This chapter compares forecasted officer strength of the unrestricted line (URL) community using two officer management policies for a single officer programmed authorization scenario. The results illustrate the applicability of the *Navy Officer Decision Support System* developed here for generating and improving Navy officer management policies.

5.1 INITIAL CONDITIONS AND PERFORMANCE MEASURES

The officer programmed authorization scenario represents real-world force structure requirements for URL Navy officers obtained from the Navy's Officer Programmed Authorizations, Military Personnel Navy, Fiscal Years 1995-2000. Table 4 lists officer programmed authorizations for this study. The programmed authorizations for the out years, fiscal years 2001 through 2005, assume a steady state condition for the Navy's force structure based on officer requirements for staffing FY2000 force structure.

Officer management policy consists of the sequence of officer management decisions defined by (5) for $\pi \subset \Pi$ (see Chapter 3). Two policies, π^0 and π^1, are developed here for meeting the officer strength goals of Table 4. Admittedly, these two officer management policies only represent the author's "best guess" at the officer management policies that the Navy might be expected to follow for the next decade.

Table 4.

Unrestricted Line (URL) Officer Programmed Authorizations for FY1995-2005

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	5075	4379	9857	5256	3591	1631	29789
1996	5007	4215	9577	5165	3502	1586	29052
1997	4730	4032	9030	4967	3387	1560	27706
1998	4481	3943	8870	4868	3320	1549	27031
1999	4409	3989	8957	4897	3322	1541	27115
2000	4341	3992	9001	4901	3318	1541	27094
2001	4341	3992	9001	4901	3318	1541	27094
2002	4341	3992	9001	4901	3318	1541	27094
2003	4341	3992	9001	4901	3318	1541	27094
2004	4341	3992	9001	4901	3318	1541	27094
2005	4341	3992	9001	4901	3318	1541	27094

However, many policy elements for both π^0 and π^1 were derived directly from either Congressionally mandated law or Navy personnel policies currently followed for governing officer management. Officer management policies used in the model not covered by law or policy were elicited during consultation with Navy military personnel managers and subject matter experts at BUPERS. For example, officer accessions for each of the forecasting years were provided by the Officer Planning Branch, PERS 212, and URL officer end strength for fiscal year 1995 was obtained from the Analysis, Research, and Development Branch, PERS 222F1 (see Appendix F for accessions and FY95 end strength). Promotion rates used in the model for π^0 are representative of recent promotion rate policies from officer promotion boards, or are rates projected by the Officer Promotions Branch, PERS 212F, for future years. Two sets of officer continuation rates are used in forecasting. One set of rates apply to "successful" officers (who continue to be) selected for promotion. The second set of rates reflect the continuation of "unsuccessful" officers who, at some grade, are considered but not

selected for promotion to the next grade. The same continuation rates were used in the forecasting procedure for generating officer management policies π^0 and π^1. This approach established π^0 as a baseline policy derived from realistic officer management policies. Attempts to improve π^0 led to the alternative officer management policy, π^1, that was then compared with π^0 using the two performance measures of Chapter 3.

In most instances, the officer continuation rates used in generating both policies for the programmed authorization scenario were computed from historical data provided by the Bureau of Naval Personnel (see Appendixes A and C). However, in some cases, historical data was not available for computing continuation rates for officers who failed to select for promotion. These continuation rates were elicited from personnel management experts at BUPERS based on their subjective (expert) judgment.

The second officer management policy π^1 was obtained by the author using a trial and error method within the prototype decision support system. The objective was to iteratively revise officer management policy π^0 to improve the objective function value obtained for π^0. Results from π^0 and π^1 are compared using the two performance measures presented in Chapter 3. Namely, a measure of officer management system efficiency based on minimization of over and understaffing with respect to the officer programmed authorization goals, and a cost measure estimating the pay and allowance costs computed for an officer management policy. Cost factors for pay and allowances are given in Appendix D.

As discussed in Chapter 3, the size of the officer management problem and the interdependence of decision variables complicate the task of generating good policy solutions to the problem. This is especially true when attempting to use the somewhat tedious and time consuming trial and error procedure. Nevertheless, these results serve as a yardstick for measuring the potential quality of feasible schedules obtained using a good heuristic or an exact procedure.

5.2 FORECASTING RESULTS FOR POLICY π^0

Figure 3 shows officer inventory forecasted over the ten-year planning horizon. These results were obtained using the initial conditions and baseline officer management policy π^0 described above.

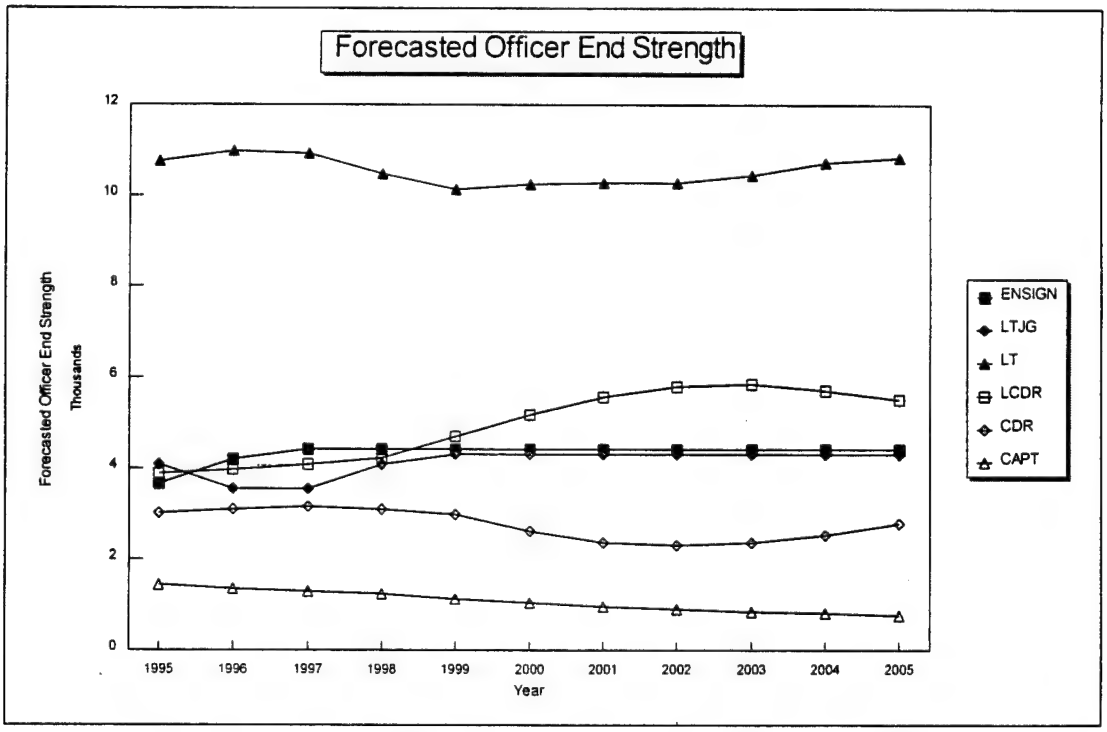

Figure 3. Forecasted Officer End Strength for the Base Case Policy π^0

Figure 3 also illustrates the impact of the baseline policy π^0 on officer end strength by grade. For example, π^0 results in a downward trend of end strengths for lieutenant commanders, commanders, and captains. The accession and promotion policies for ensigns and lieutenants (JG), on the other hand, cause these end strengths to reach steady state after just a few years, as expected.

As discussed previously, the difference between forecasted officer strength and officer programmed authorizations, by grade, for each year of the planning horizon serves as the performance measure of system efficiency (see Chapter 3). Figure 4 compares forecasted inventory and authorizations for policy π^0.

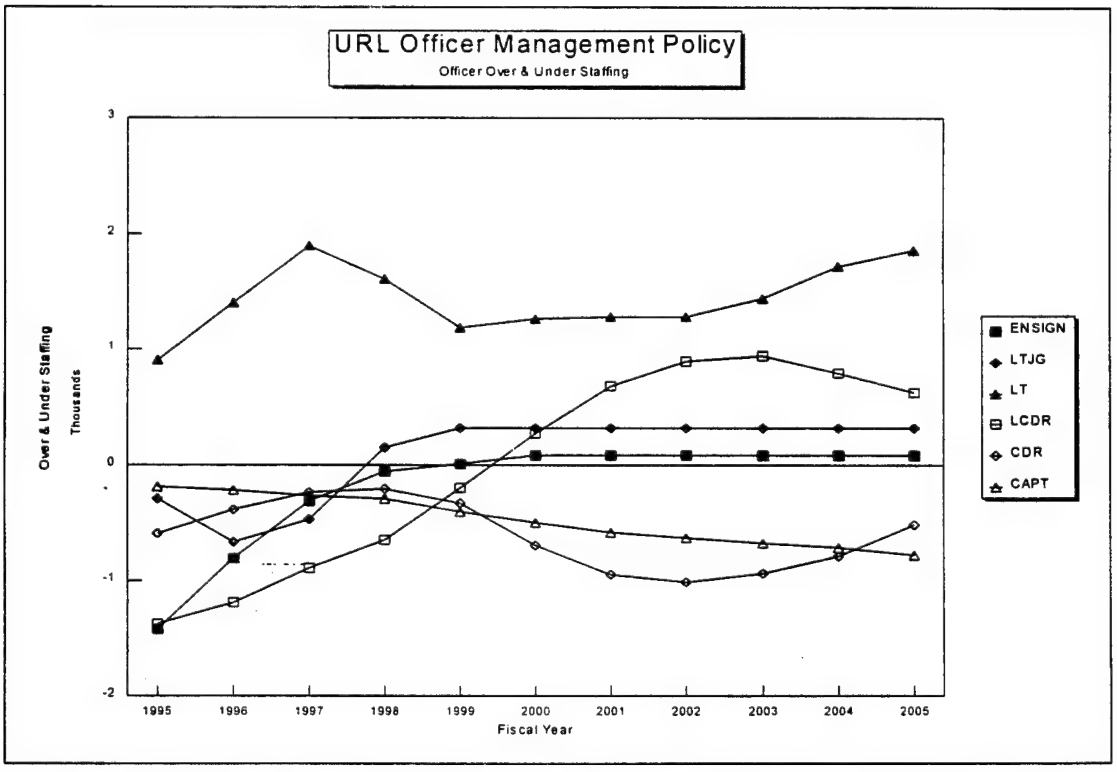

Figure 4. Comparison of URL End Strength and Authorizations for Policy π^0

The policy formulation problem is suboptimized by making these differences as small as possible. The *utopian* value of the performance measure is zero for each grade and at each stage of the problem.

Numerical results computed for the differences between forecasted URL officer strength and officer programmed authorizations are provided below in Table 5. Negative values in a cell indicate an *officer strength shortfall*, where the total number of officers forecasted for a fiscal year, and summed across all year groups for that grade, is less than the programmed authorization.

Table 5.

Numerical Results Comparing URL End Strength and Authorizations for Policy π^0

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT
1995	-1425	-292	902	-1381	-588	-186
1996	-807	-664	1399	-1192	-390	-218
1997	-311	-475	1898	-894	-233	-261
1998	-61	148	1601	-644	-212	-294
1999	11	318	1186	-202	-330	-406
2000	79	318	1256	269	-692	-494
2001	79	318	1274	679	-952	-578
2002	79	318	1280	895	-1013	-632
2003	79	318	1436	942	-939	-678
2004	79	318	1717	792	-793	-719
2005	79	318	1853	622	-515	-775

The comparison of differences in Figure 4 reveals that lieutenants are significantly overstrength throughout the planning horizon. The overstaffing ranges between approximately 900 and 1900 officers. Commanders and captains are understrength relative to authorizations throughout the ten year period. Initially, lieutenant commanders are significantly understrength in FY95, but by FY 2000 the officer management policies increased LCDR end strength to the authorized levels. In the years beyond FY2000, the

results indicate that policies may cause LCDR end strength to exceed authorizations by as many as 900 officers. Figure 4 also shows that the officer management policies for ensigns and lieutenants (JG) are both consistent and highly efficient. Tables 6 and 7 give numerical results for the forecasted URL officer end strength, and the cost performance measure, respectively.

Table 6.

Numerical Results of URL Officer Forecasted End Strength for Policy π^0

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	3650	4087	10759	3875	3003	1445	26819
1996	4200	3551	10976	3973	3112	1368	27181
1997	4419	3557	10928	4073	3154	1299	27430
1998	4420	4091	10471	4224	3108	1255	27570
1999	4420	4307	10143	4695	2992	1135	27692
2000	4420	4310	10257	5170	2626	1047	27829
2001	4420	4310	10275	5580	2366	963	27914
2002	4420	4310	10281	5796	2305	909	28021
2003	4420	4310	10437	5843	2379	863	28252
2004	4420	4310	10718	5693	2525	822	28489
2005	4420	4310	10854	5523	2803	766	28676

Table 7.

Pay and Allowance Costs for URL Forecasted End Strength for Policy π^0 ($millions)

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	$132.88	$197.42	$655.78	$287.02	$269.19	$156.40	$1,698.69
1996	$155.08	$173.38	$676.57	$297.19	$281.83	$149.83	$1,733.88
1997	$167.69	$178.25	$690.97	$312.87	$293.32	$142.20	$1,785.30
1998	$173.27	$209.65	$678.87	$332.56	$296.38	$137.46	$1,828.20
1999	$177.92	$226.08	$672.63	$377.93	$291.89	$134.82	$1,881.26
2000	$182.63	$231.41	$695.85	$425.40	$262.03	$124.33	$1,921.65
2001	$188.78	$238.17	$717.66	$472.47	$243.21	$121.12	$1,981.41
2002	$188.78	$238.17	$718.11	$490.74	$236.91	$114.34	$1,987.05
2003	$188.78	$238.17	$729.00	$494.72	$244.47	$108.58	$2,003.72
2004	$188.78	$238.17	$748.58	$482.05	$259.53	$103.47	$2,020.59
2005	$188.78	$238.17	$758.10	$467.60	$288.11	$96.41	$2,037.18

The values obtained for system efficiency and cost for π^0 were $M_{\pi^0} = 43{,}106$ officer years of over and understaffing, and $N_{\pi^0} = \$1.562$ M. Note that N_{π^0}, summed over T, only reflects costs associated with overstaffing and does not account for negative pay and allowance costs due to understaffing (see Chapter 3, (8) for further details).

5.3 FORECASTING RESULTS FOR POLICY π^1

Next, the URL officer strengths for policy π^1 were obtained by revising the initial, base case policies of π^0. The revised forecasted officer strengths for π^1 are shown below in Figure 5.

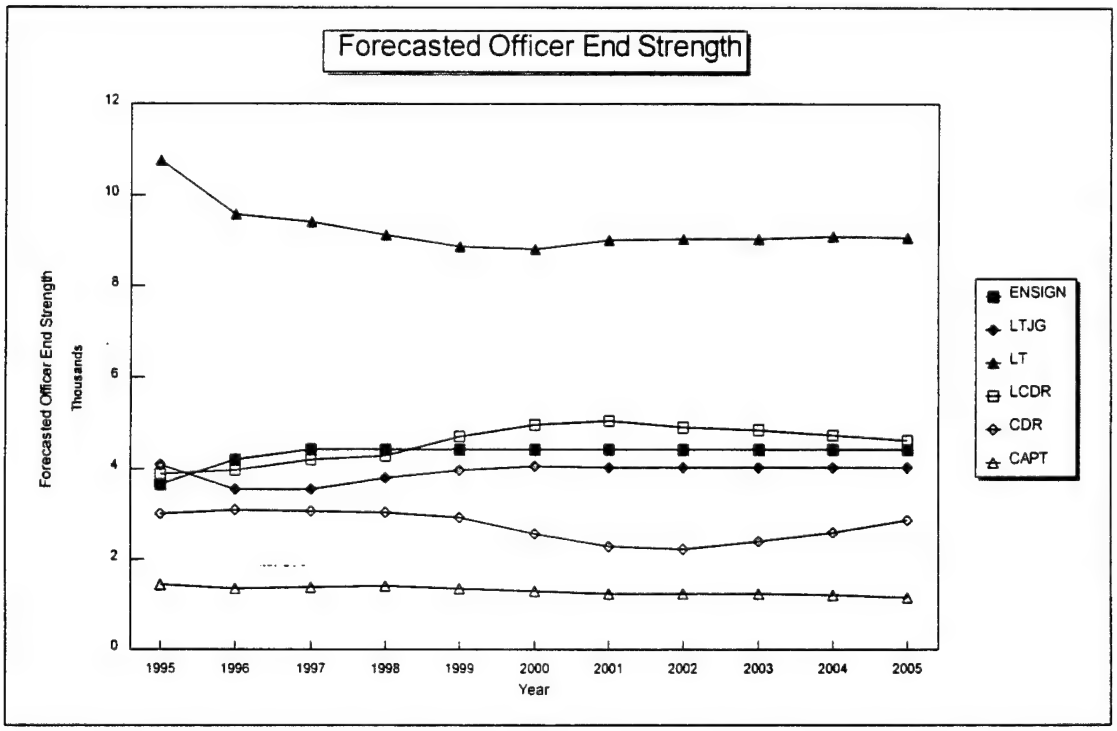

Figure 5. Forecasted Officer End Strength for the Base Case Policy π^1

The officer strengths of Figure 5 illustrate that revising π^0 somewhat mitigated the oscillating effects of policy π^0 on officer end strength. This is especially true for lieutenant commanders, commanders, and captains. The ensign and lieutenant (JG) end strengths did not require policy adjustments.

Figure 6 illustrates π^1 results obtained by the author to improve policy π^0. The author iteratively revised policies at each stage to make the differences between forecasted officer end strength and officer programmed authorizations as small as possible.

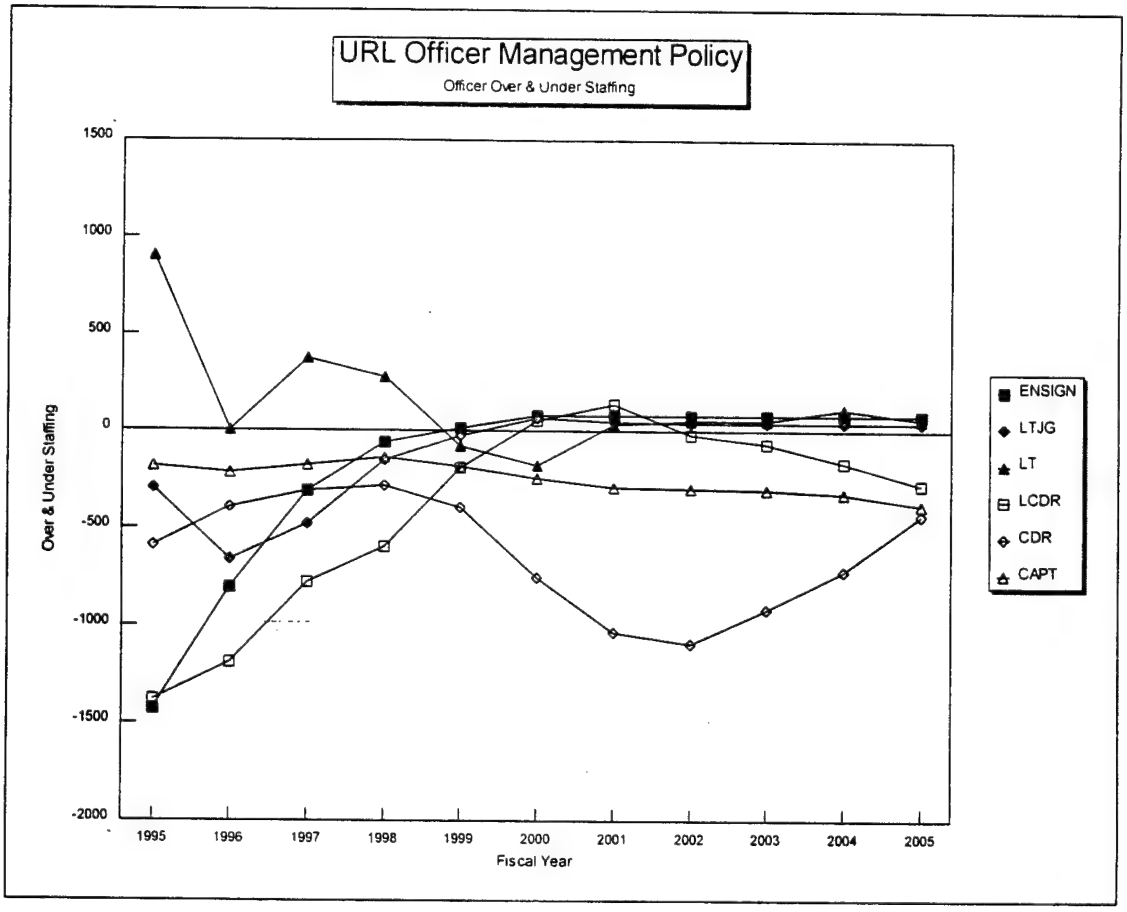

Figure 6. Comparison of URL End Strength and Authorizations for Policy π^1

This improved the system efficiency performance measure by making the differences as close to the *utopian* value of zero as possible, at each stage and grade of the problem.

A comparison of Figures 4 and 6 reveals that policy π^1 substantially improved the overall consistency and efficiency of URL officer end strength management. This is especially true regarding lieutenants, commanders, and to a lesser extent, captains. The policy adjustments made early in the planning horizon tightened control of officer end strength in these grades during fiscal years 1999 and 2000. Efforts to revise officer management policy to correct the understaffing problem for commanders were mostly unsuccessful. For policy π^1, commanders and captains remain understrength throughout the ten year period.

Numerical results computed for policy π^1 are provided below in Tables 8, 9, and 10. Table 8 compares forecasted URL end strength with officer programmed authorizations.

Table 8.

Numerical Results Comparing URL End Strength and Authorizations for Policy π^1

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT
1995	-1425	-292	902	-1381	-588	-186
1996	-807	-664	-1	-1192	-390	-218
1997	-311	-475	371	-778	-308	-179
1998	-61	-152	273	-593	-281	-136
1999	11	-29	-76	-191	-393	-185
2000	79	64	-174	50	-756	-243
2001	79	44	29	136	-1037	-285
2002	79	41	53	-22	-1093	-295
2003	79	41	49	-68	-917	-299
2004	79	41	111	-162	-721	-320
2005	79	41	62	-275	-432	-377

As noted previously, negative values indicate an officer end strength shortfall where the number of officers forecasted for that grade and fiscal year is less than the officer programmed authorization.

Table 9 contains the forecasted URL officer end strength under the officer management policy of π^1.

Table 9.

Numerical Results of URL Officer Forecasted End Strength for Policy π^1

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	3650	4087	10759	3875	3003	1445	26819
1996	4200	3551	9576	3973	3112	1368	25781
1997	4419	3557	9401	4189	3079	1381	26026
1998	4420	3791	9143	4275	3039	1413	26080
1999	4420	3960	8881	4706	2929	1356	26251
2000	4420	4056	8827	4951	2562	1298	26115
2001	4420	4036	9030	5037	2281	1256	26061
2002	4420	4033	9054	4879	2225	1246	25857
2003	4420	4033	9050	4833	2401	1242	25980
2004	4420	4033	9112	4739	2597	1221	26123
2005	4420	4033	9063	4626	2886	1164	26192

Table 10 summarizes the average pay and allowance costs for the forecasted URL officer end strength for each grade and fiscal year.

Table 10.

Pay and Allowance Costs for URL Forecasted End Strength for Policy π^1 ($millions)

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	$132.88	$197.42	$655.78	$287.02	$269.19	$156.40	$1,698.69
1996	$155.08	$173.38	$590.28	$297.19	$281.83	$149.83	$1,647.58
1997	$167.69	$178.25	$594.43	$321.73	$286.36	$151.20	$1,699.67
1998	$173.27	$194.28	$592.74	$336.55	$289.80	$154.68	$1,741.32
1999	$177.92	$207.86	$588.97	$378.82	$285.68	$161.03	$1,800.28
2000	$182.63	$217.78	$598.83	$407.45	$255.71	$154.22	$1,816.62
2001	$188.78	$223.04	$630.73	$426.45	$234.49	$158.05	$1,861.54
2002	$188.78	$222.85	$632.40	$413.09	$228.67	$156.75	$1,842.55
2003	$188.78	$222.88	$632.13	$409.21	$246.82	$156.20	$1,856.03
2004	$188.78	$222.88	$636.41	$401.27	$266.91	$153.65	$1,869.91
2005	$188.78	$222.88	$632.98	$391.67	$296.66	$146.44	$1,879.42

The values obtained for the system efficiency and cost performance criteria based on π^1 were $M_{\pi^1} = 21.563$ officer years of over and understaffing, and $N_{\pi^1} = \$169$ M.

Table 11 summarizes the results and the percent improvement for the two policies π^0 and π^1.

Table 11.

Performance Measure Values for Officer Management Policies π^0 and π^1

Performance Measure	π^0	π^1	% Difference
System Efficiency (M_π)	43.106	21.563	50%
Cost (N_π)	\$1.562 M	\$169 M	89%

For the one officer programmed authorization scenario and the two officer management policies considered, the policy π^1 generated performance measure values that were approximately 50% and 89% better than the performance measures for policy π^0. The 50% improvement in efficiency was mostly attributable to bringing the overstaffing of lieutenants more in line with authorizations. The main reason for the magnitude of improvement in the cost measure is due, in part, to the biased nature of the performance measure. The cost measure disregards the effects of understaffing; that is, they were zeroed out. Therefore, although policy π^1 substantially tightens the overstrength grades with respect to policy π^0, it fails to significantly improve the understaffing problem.

This would otherwise offset the marked differences in the performance measure values for the two policies.

In summary, the value of the results presented here lies in demonstrating that there may be efficiencies gained from using the decision support system to identify and correct officer over and understaffing problems. The results illustrate how the decision support system can be used to methodically tighten officer strengths, by grade and year of the planning horizon, thereby improving the efficiency of the officer management system and reducing costs associated with overstaffing.

CHAPTER 6

CONCLUSIONS

This paper mathematically models and solves a complex personnel forecasting problem of practical interest to the United States Navy. Specifically, the problem is one of forecasting Navy officer strength by grade and year group over a ten-year planning horizon. Notable features of officer management that complicate the Navy's officer forecasting problem include the following:

1. The interdependence of officer management policy decisions such as officer accessions, promotions, and separations.
2. Varying demand over time for Navy officers, by grade, as measured by officer programmed authorizations reflecting force structure requirements.
3. Varying decision values for officer accessions, promotion rates, and officer separations and the uncertainty of the impact of policy decisions on officer strength until years after the policy decisions are implemented.
4. The size of the officer management problem (see 3.1).

6.1 BENEFITS OF THE DECISION SUPPORT SYSTEM

The decision support system permits Navy personnel managers to study a broad range of practical problems. For example, at Department of the Navy, the system can be used to examine the impact of various force planning factors on officer strength planning over

planning horizons of varying lengths. These include force structure changes, changes to laws and policies governing officer management, and special situations such as mobilization for war. Other benefits are summarized below.

IMPOVED OFFICER STRENGTH FORECASTING ESTIMATES

Currently, methods for forecasting officer strength from year to year use one set of continuation rates. These reflect the cumulative attriting effects of various personnel management policies as well as social and economic factors on an officer year group. This paper presents a forecasting model for projecting current officer inventory over a ten-year planning horizon using three sets of transition rates. These are promotion rates, continuation rates for promoted officers and officers selected for promotion, and continuation rates for officers considered but not selected for promotion. In addition, the model also explicitly accounts for direct gains and losses to officer strength by accessions, redistribution of officers, and officer separations from reductions in force (RIF) and selective early retirements (SER). This permits Navy personnel managers to isolate and explicitly model the effects of specific policies on future officer strength. If adopted, it is expected that this approach will improve the accuracy of personnel forecasting methods used by Navy personnel managers. Furthermore, it is hoped that these methods will help personnel managers better understand the impact of policy changes on future officer end strength.

AUTOMATED OFFICER STRENGTH FORECASTING METHOD

The decision support system fully automates the procedures for forecasting Navy officer inventory over a ten-year planning horizon. Officer management policies are revised manually using a trial and error method. At present, the system user must edit system model parameters such as accessions, promotion rates and promotion timing (i.e., flow points), and separation decision variables in an attempt to improve the current policy. Despite this major shortcoming of the current system, it provides officer program managers with a fully automated, computer-based procedure for quickly forecasting officer strength over a ten-year planning horizon. These results have high practical value as a preliminary step to developing more precise officer management policies.

USEFUL SYSTEM OUTPUT BASED ON PRACTICAL PERFORMANCE MEASURES

The system generates potentially useful output such as the estimates of over and understaffing, by grade, relative to programmed authorizations for each year of the planning horizon. The model output reflects officer management system throughput over time for meeting future Navy force structure requirements by grade and community. The system can be easily modified to estimate the number of officers available (eligible) by grade for meeting joint duty assignment requirements based on officer professional military education throughput. It can also evaluate the feasibility of officer management policies for rapidly expanding the officer corps in response to mobilizing large numbers of military personnel. Finally, the system can help Navy personnel managers evaluate the economic impact of different officer management policies as measured by pay and

allowance costs for officers (by grade) for officer strength throughput determined from an officer management policy.

The DSS employs two practical officer management performance measures to provide decision makers with a rational basis for selecting the "best" policy from competing, feasible ones. The performance criteria are a measure of officer management efficiency that minimizes over and understaffing and a measure of overstaffing costs based on pay and allowances for the forecasted officer strength.

APPLICATIONS TO OTHER SERVICES

Despite the current Navy officer orientation of the prototype decision support system, it can be adapted to other Navy military personnel programs. The system can also be used to forecast personnel end strength from other military services as well.

6.2 FUTURE WORK

The main objectives of this work focused on the formulation of a forecasting model for the Navy's officer management program, and implementation of the forecasting model in a decision support system where a trial-and-error decision process is currently used to improve officer management policies. Two performance measures have been incorporated into the model for evaluating the quality of competing policies. We conclude by suggesting potential research areas to be studied in the future:

- The model assumes officers are selected for promotion and promoted in the same fiscal year. Extend the model to capture the effects of backlogging officer promotions on officer end strength, and on officer pay and allowance costs;

- Incorporate other direct and indirect personnel costs, including training costs (as appropriate), into the cost estimation module.

- Investigate the possibility of incorporating stochastic aspects of officer management, such as, officer continuation (attrition), promotions, and the timing of promotions;

- Explore the possibility of extending the forecasting model and the decision support system to other Navy personnel programs (e.g., other officer communities and enlisted personnel), and the personnel programs of other branches of military service as well (i.e., Army, Air Force, and Marines);

- If the size of the real-world permits, implement an exact decision process for generating optimal officer management policies. Otherwise, implement an efficient heuristic decision process for obtaining precise policies;

- Conduct additional statistical analysis of the continuation rates for aging officer cohorts. Develop good rates for different forecasting scenarios that reflect the behavior of "successful" and "unsuccessful" officers.

In conclusion, the extension presented here for forecasting Navy officer end strength will hopefully motivate further research efforts in this important area of military force planning and military operations research.

APPENDIX A. HISTORICAL NAVY OFFICER END STRENGTH BY GRADE[4]

Table 12.

Historical Officer Strength for Ensign (O-1)

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-1 by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	4151	3907	4348	4945	4073	4531	4762	5072	4811	5050	3973	5627	5503	4715	4503	4466	4442	3904	3569	3129	2659
1	4933	4138	3731	3560	4526	4314	4689	4817	5187	4945	5297	4220	5807	5620	5036	4768	4696	4546	4066	3701	3392
2	12	6	21	20	7	37	40	62	48	63	74	61	52	61	157	117	77	82	106	61	62
3	1	1	0	4	3	2	33	39	48	44	47	48	52	44	43	53	46	56	55	34	36
4	0	0	1	0	1	2	3	1	13	27	9	5	6	8	6	12	12	8	5	7	4
5	1	0	0	0	1	1	4	3	0	4	2	1	3	2	2	2	3	4	1	2	5
6	0	0	0	0	0	0	1	0	1	1	2	2	0	1	0	0	1	1	3	3	4
7	1	0	0	0	0	0	1	1	0	1	3	3	3	0	0	0	1	2	3	6	3
8	0	0	0	2	0	0	0	1	0	1	1	2	3	4	1	1	0	1	4	4	13
9	0	0	0	0	1	0	0	0	1	0	0	0	2	3	3	1	0	1	2	4	7
10	0	0	0	0	0	1	0	0	0	1	0	0	0	1	3	0	1	1	3	2	4
11	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	2	3	1
12	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	2	3
13	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
14	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	7	19	19	16	40	353

Table 13.

Historical Officer Strength for Lieutenant JG (O-2)

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-2 by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	0	3	13	7	0	4	0	4	7	1	5	6	13	1	0	2	1	1	1	1	2
1	19	18	599	476	673	14	8	25	7	5	1	0	7	9	10	20	13	19	10	27	24
2	6162	5278	4469	4568	4193	5483	4368	4802	4920	5190	4906	5250	4259	5668	5467	4977	4734	4593	4413	3924	3554
3	4850	4757	4380	3711	3937	3688	4923	4414	4759	4864	5094	4873	4807	4133	5440	5417	4942	4539	4448	4072	3586
4	97	232	158	131	143	109	174	72	193	106	489	261	137	244	156	225	250	142	149	78	91
5	2	13	10	9	9	8	8	7	9	5	6	8	11	5	9	18	30	9	11	9	27
6	2	1	4	0	1	1	4	5	0	1	1	2	0	4	2	2	3	2	8	1	5
7	2	1	0	1	0	2	0	0	1	0	0	1	0	0	1	1	2	1	2	1	0
8	2	1	0	0	1	0	1	0	0	1	0	0	3	0	0	1	0	1	0	1	1
9	0	1	4	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	1
10	1	0	1	3	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0
11	0	0	0	0	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
12	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0
14	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0
31	0	0	0	0	5	3	1	0	2	0	0	0	0	0	0	0	0	2	0	5	37

Table 14.

Historical Officer Strength for Lieutenant (O-3)

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-3 by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	8	23	44	15	0	4	5	1	0	2	3	19	28	11	2	5	0	5	4	1	0
1	9	6	9	3	1	5	17	5	6	1	1	14	77	127	48	13	62	27	34	38	80
2	17	6	23	2	4	1	4	4	0	1	0	9	7	25	8	2	2	7	20	2	2
3	119	60	121	564	522	520	576	33	28	28	1	2	298	16	63	4	44	53	48	252	213
4	4288	4619	4226	4134	4132	4285	3886	5588	4422	4951	4342	4776	4648	4652	4008	5093	5205	4673	4388	4347	4154
5	3884	3678	4148	3856	3617	3702	3732	3708	5236	4296	4632	4437	4713	4386	4515	3793	4805	4787	4333	4056	4037
6	2739	3136	3117	3503	3063	3066	3207	3342	3350	4901	3944	4172	4035	4229	3989	4272	3536	4362	4413	3982	3798
7	2298	2174	2475	2657	2934	2682	2661	2794	2989	3093	4338	3380	3616	3534	3718	3493	3825	3083	3824	3943	3585
8	1326	1888	1860	2137	2090	2511	1844	2097	2244	2697	2798	3907	3025	3217	3243	3353	3010	3355	2643	3226	3462
9	735	372	837	943	732	659	229	206	199	330	1088	1022	2040	1947	1971	2698	2837	2562	2808	2337	2803
10	286	412	41	132	149	81	88	38	81	48	49	115	269	658	568	781	966	1154	1052	1408	1094
11	142	126	162	15	20	15	27	30	28	17	18	23	33	65	106	112	163	138	192	155	303
12	13	10	20	21	4	7	6	16	16	8	8	13	16	21	36	46	55	36	24	21	28
13	1	1	1	10	4	2	5	3	4	1	1	6	6	6	11	20	31	27	26	13	10
14	6	0	0	15	2	0	0	1	3	1	1	1	1	2	4	10	12	24	18	16	8
15	0	1	0	0	4	0	0	0	0	2	0	0	2	1	1	3	9	5	22	11	12
16	0	0	0	0	0	1	1	0	0	0	0	0	1	2	0	1	2	9	4	14	3
17	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	2	7	1	8
18	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	1	0	1	1	6	1
19	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	1	2
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	1
21	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0
22	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	1	2	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	1	0
31	2	0	1	0	2	12	5	2	3	6	20	51	37	0	0	13	23	13	35	40	191

Table 15.

Historical Officer Strength for Lieutenant (O-3) less O-3 who Fail Officer Select to O-4

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-3 MINUS O-3 FOS by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	8	23	44	15	0	4	5	1	0	2	3	19	28	11	2	5	0	5	4	1	0
1	9	6	9	3	1	5	17	5	6	1	1	14	77	126	48	13	61	27	34	38	79
2	17	6	23	2	4	1	4	4	0	1	0	9	7	25	8	2	2	7	20	2	2
3	119	60	121	564	522	520	576	33	28	28	1	2	298	16	63	4	44	53	48	252	213
4	4288	4619	4226	4134	4132	4284	3881	5588	4420	4944	4338	4771	4648	4650	4008	5093	5205	4673	4388	4347	4154
5	3884	3677	4148	3856	3617	3702	3716	3707	5222	4296	4627	4433	4709	4386	4515	3792	4805	4787	4333	4056	4037
6	2739	3136	3116	3502	3063	3066	3206	3339	3349	4895	3944	4168	4033	4227	3988	4272	3536	4362	4413	3982	3798
7	2293	2174	2475	2654	2934	2678	2660	2793	2984	3092	4335	3380	3614	3532	3717	3492	3825	3083	3823	3943	3585
8	1165	1887	1860	2137	2089	2331	1796	2079	2214	2685	2792	3900	3025	3215	3241	3352	3010	3355	2643	3226	3462
9	460	18	447	704	514	542	59	142	99	203	847	845	1834	1796	1799	2668	2831	2559	2804	2331	2782
10	261	381	16	40	26	17	16	25	43	27	21	77	179	447	355	555	608	765	761	1194	906
11	24	106	128	7	13	6	7	13	20	9	4	9	15	17	18	31	39	30	33	19	33
12	0	0	1	2	0	2	3	5	9	3	3	5	8	7	4	7	19	5	3	6	7
13	0	0	0	9	2	0	4	2	4	1	1	2	4	4	1	5	6	6	4	2	1
14	1	0	0	14	2	0	0	1	2	1	0	0	1	2	3	2	3	2	5	2	0
15	0	1	0	0	3	0	0	0	0	2	0	0	1	1	1	3	3	1	3	3	2
16	0	0	0	0	0	0	1	0	0	0	0	0	1	2	0	1	2	3	1	2	0
17	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	2	2	0	1
18	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	1	0	1	1	2	0
19	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	1	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1
21	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
22	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	1	0
31	2	0	1	0	2	12	5	2	3	6	20	51	37	0	0	13	23	13	35	40	191

Table 16.

Historical Officer Strength for Lieutenant (O-3) who Fail Officer Select (FOS) for O-4

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-3 FOS to O-4 by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	1	5	0	2	7	4	5	0	2	0	0	0	0	0	0	0
5	0	1	0	0	0	0	16	1	14	0	5	4	4	0	0	1	0	0	0	0	0
6	0	0	1	1	0	0	1	3	1	6	0	4	2	2	1	0	0	0	0	0	0
7	5	0	0	3	0	4	1	1	5	1	3	0	2	2	1	1	0	0	1	0	0
8	161	1	0	0	1	180	48	18	30	12	6	7	0	2	2	1	0	0	0	0	0
9	275	354	390	239	218	117	170	64	100	127	241	177	206	151	172	30	6	3	4	6	21
10	25	31	25	92	123	64	72	13	38	21	28	38	90	211	213	226	358	389	291	214	188
11	118	20	34	8	7	9	20	17	8	8	14	14	18	48	88	81	124	108	159	136	270
12	13	10	19	19	4	5	3	11	7	5	5	8	8	14	32	39	36	31	21	15	21
13	1	1	1	1	2	2	1	1	0	0	0	4	2	2	10	15	25	21	22	11	9
14	5	0	0	1	0	0	0	0	1	0	1	1	0	0	1	8	9	22	13	14	8
15	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	6	4	19	8	10
16	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6	3	12	3
17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	7
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 17.

Historical Officer Strength for Lieutenant Commander (O-4)

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-4 by YCS
SOURCE: FAIMO--NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	6	1	0	0	0	2	2	0	0	0	0	1	0	1	2	0	0	0	0	0	0
1	0	7	1	0	1	1	9	2	2	1	0	3	2	3	7	14	22	18	30	46	49
2	0	0	0	1	0	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0
3	4	0	1	2	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	0
4	3	14	23	3	0	1	2	0	0	0	0	0	5	9	1	2	1	11	3	0	0
5	2	3	8	10	1	1	2	0	0	0	1	0	0	1	2	2	1	1	2	1	0
6	18	174	6	15	15	2	4	2	1	0	0	1	1	6	3	1	3	2	0	0	0
7	48	85	198	46	7	23	27	5	1	3	0	0	5	3	5	1	2	2	2	2	1
8	632	354	98	50	226	133	636	408	400	124	13	30	21	37	24	10	14	8	4	5	6
9	2274	1410	1355	967	1332	1366	2191	2048	2164	2193	1658	1620	1614	903	1068	469	340	240	198	63	98
10	1871	1927	1846	2034	1597	1926	1760	2080	2170	2307	2296	2329	2140	2631	2089	2020	2015	1834	1656	1367	1128
11	1659	1742	1861	1770	1860	1609	1840	1911	1910	2122	2215	2185	2191	2132	2705	2190	2343	2406	2281	2157	2172
12	1738	1416	1666	1751	1643	1716	1488	1837	1820	1641	2020	2086	2052	2059	1990	2598	2053	2171	2302	2180	2065
13	1203	1547	1300	1460	1553	1501	1573	1368	1740	1776	1579	1918	1971	1928	1888	1866	2408	1921	2037	2101	2052
14	1532	1168	1429	1225	1245	1111	766	757	951	1190	1571	1347	1578	1658	1607	1696	1651	2175	1762	1892	1997
15	818	1155	513	705	388	444	381	290	288	289	370	457	469	638	745	884	847	773	1128	779	1137
16	443	458	483	361	395	302	348	287	250	233	234	295	350	337	513	594	572	526	526	653	407
17	398	405	396	376	326	359	266	316	266	222	208	217	274	315	300	443	531	495	377	376	352
18	256	359	352	364	327	299	326	237	303	230	202	187	206	254	295	280	349	403	390	314	224
19	204	210	275	278	296	257	226	285	187	239	172	144	136	178	207	223	222	270	293	268	175
20	39	39	50	35	58	98	50	57	82	53	44	37	36	40	47	44	37	51	58	71	117
21	18	13	10	15	17	33	76	36	31	24	24	14	23	28	21	28	27	28	33	26	42
22	6	11	5	6	5	10	29	47	19	4	7	15	10	14	23	14	23	22	16	19	20
23	5	4	3	3	2	5	11	25	14	8	0	6	6	3	10	14	10	17	15	9	8
24	1	2	3	1	3	0	2	9	3	3	2	0	3	4	0	8	12	6	16	14	6
25	3	0	0	2	3	1	1	2	5	0	2	1	0	2	1	0	6	8	4	11	9
26	0	1	0	0	1	2	2	2	1	3	0	1	0	0	1	2	0	2	2	1	6
27	3	0	0	0	0	0	1	1	0	1	2	0	1	0	0	1	1	0	1	0	0
28	0	1	0	0	0	0	0	2	0	0	1	0	0	1	0	0	1	1	0	0	0
29	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0
30	0	0	0	1	1	0	3	0	1	0	0	0	0	0	0	1	0	0	1	2	2
31	4	0	0	1	1	5	1	1	1	0	3	1	2	0	0	11	25	5	35	21	56

Table 18.

Historical Officer Strength for Lieutenant Commander (O-4) to Fail Officer Select (FOS) for O-5

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-4 FOS to O-5 by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	6	5	2	6	1	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
9	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	1	0	0	0	0	0	0	6	1	1	1	0	0	0	0	0	0	0	0	0
11	0	0	0	1	0	1	0	0	0	5	1	2	0	0	2	0	0	0	0	0	0
12	2	9	0	13	1	0	0	0	0	0	5	1	1	0	0	1	0	1	0	0	0
13	2	16	0	16	18	1	3	1	0	9	0	5	2	3	11	2	1	0	0	0	0
14	11	4	0	6	114	158	236	185	113	118	113	50	74	78	54	28	10	18	6	4	0
15	347	226	315	337	363	389	352	250	236	242	309	364	302	403	427	363	360	361	365	309	250
16	441	454	359	338	385	287	345	270	224	213	223	276	331	297	372	406	417	356	349	428	245
17	396	405	389	361	321	353	260	307	250	208	200	211	262	308	294	361	389	379	345	365	307
18	255	358	348	361	327	294	324	230	298	222	197	181	202	248	289	277	334	370	380	306	220
19	203	210	274	276	295	256	225	277	185	235	168	144	131	175	203	219	219	264	284	265	175
20	39	38	50	34	58	95	49	55	81	51	42	36	36	38	46	42	35	50	56	69	115
21	18	13	10	15	16	32	72	33	28	22	23	13	21	27	17	27	22	27	31	26	41
22	6	11	5	6	5	7	26	43	16	4	7	14	9	13	22	13	23	20	15	19	18
23	5	3	3	3	2	4	7	22	13	7	0	6	6	3	10	13	9	17	13	9	8
24	0	2	2	1	3	0	1	3	1	1	1	0	3	3	0	7	11	6	15	12	6
25	3	0	0	2	1	1	0	1	2	0	1	0	0	2	1	0	6	8	4	9	7
26	0	1	0	0	1	1	1	0	0	1	0	1	0	0	1	1	0	2	2	1	5
27	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0
28	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0
30	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 19.

Historical Officer Strength for Commander (O-5)

OPIS ALNAV less Warrants & TARS, Inventory: Inventory Values for Designator=Total Navy+Unk,
Grade=O-5 by YCS
SOURCE: FAIMO-NPRDC

ycs/fy	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	3	3	2	0	0	0	1	1	0	0	2	0	1	2	17	23	15	14	15	17
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
5	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	1	1	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0
8	0	0	0	0	0	2	0	0	0	1	0	0	1	2	0	0	0	0	1	0	0
9	0	2	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1	0
10	1	5	0	1	0	0	0	0	0	0	1	0	0	4	0	4	7	0	0	0	0
11	2	3	7	0	1	0	1	1	0	0	1	0	0	2	0	1	1	1	0	0	0
12	14	108	4	81	1	2	0	2	3	0	0	0	0	2	2	0	2	0	1	0	0
13	2	6	28	94	83	53	35	20	26	22	0	0	8	31	49	14	25	6	0	1	0
14	7	3	10	7	165	397	688	670	419	487	151	176	247	225	239	171	145	124	32	25	17
15	803	352	677	708	805	951	1068	1067	1061	1075	1284	1213	1032	1114	1119	965	920	960	1071	927	688
16	1273	1237	1005	855	1036	895	1018	1234	1163	1156	1076	1349	1300	1142	1201	1205	1222	1145	1086	1416	1128
17	1463	1234	1236	1031	833	1036	883	1168	1152	1097	1144	1042	1307	1296	1117	1211	1250	1247	1279	1139	1502
18	1158	1425	1160	1170	979	807	1009	800	1131	1133	1069	1118	1005	1276	1229	1077	1207	1262	1284	1292	1111
19	1007	1085	1297	1085	1078	893	772	925	760	1076	1036	985	1037	937	1187	1123	996	1127	1189	1166	1195
20	796	844	835	1097	941	945	749	657	802	652	956	853	810	824	673	905	863	817	883	863	932
21	317	347	308	370	689	641	597	331	260	426	355	519	434	326	330	324	473	518	363	361	392
22	231	224	205	217	204	253	199	238	150	133	176	111	248	282	230	207	186	227	196	177	212
23	170	174	152	146	164	150	172	128	165	109	93	125	85	165	194	165	157	103	141	124	109
24	111	133	122	108	103	117	107	138	82	121	82	64	92	66	122	145	112	77	59	102	79
25	42	77	79	80	75	68	74	85	97	52	85	58	43	74	46	94	107	66	48	40	61
26	17	10	13	12	12	15	13	27	23	21	13	42	14	6	22	15	51	55	27	19	29
27	9	4	4	3	6	5	11	13	12	8	8	6	26	8	3	11	10	39	45	18	16
28	4	2	4	1	3	5	4	7	5	6	6	6	4	20	6	1	8	6	31	37	15
29	1	4	0	0	0	2	6	2	3	1	4	4	3	2	12	5	0	5	3	24	31
30	5	4	4	4	3	3	4	7	5	2	3	4	4	5	3	10	7	8	11	10	30
31	22	0	0	0	0	0	0	1	0	0	1	0	0	0	0	5	9	6	10	4	29

Table 20.

Historical Officer Strength for Commander (O-5) less O-5 to Fail Officer Select (FOS) to O-6

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O5 MINUS O5 FOS by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	0	0	0	1	1	0	0	2	0	1	2	13	17	12	12	13	16
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
5	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	1	1	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0
8	0	0	0	0	0	2	0	0	0	1	0	0	1	2	0	0	0	0	1	0	0
9	0	2	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1	0
10	1	5	0	1	0	0	0	0	0	0	1	0	0	4	0	4	7	0	0	0	0
11	2	3	7	0	1	0	1	1	0	0	1	0	0	2	0	1	1	1	0	0	0
12	14	108	4	81	1	2	0	2	3	0	0	0	0	2	2	0	2	0	1	0	0
13	2	6	28	94	83	53	35	20	26	22	0	0	8	31	49	14	25	6	0	1	0
14	7	3	10	7	165	396	688	670	418	487	151	176	247	225	239	171	145	124	32	25	17
15	803	352	677	708	805	951	1067	1067	1061	1075	1284	1212	1031	1114	1119	965	920	960	1071	927	688
16	1270	1228	1005	855	1036	895	1018	1233	1162	1156	1075	1349	1299	1141	1201	1205	1222	1145	1086	1416	1128
17	1463	1229	1227	1030	833	1036	883	1168	1151	1095	1143	1042	1307	1295	1116	1211	1250	1247	1279	1139	1502
18	1157	1425	1156	1158	976	805	1006	800	1131	1132	1067	1118	1005	1276	1228	1076	1207	1262	1284	1292	1111
19	1002	1082	1296	1080	1066	891	770	921	760	1076	1033	984	1037	933	1178	1108	992	1118	1186	1162	1187
20	694	775	767	1090	934	824	745	654	800	651	949	826	788	776	623	873	817	786	821	798	876
21	3	2	15	117	495	515	440	192	142	274	238	335	254	110	115	135	294	331	174	135	140
22	1	0	4	7	6	13	27	47	17	6	5	8	48	78	76	35	25	10	11	23	35
23	0	1	0	3	3	2	9	8	16	5	2	1	7	11	17	25	19	4	5	8	6
24	1	0	1	1	0	3	3	13	3	7	5	4	3	3	5	5	6	2	3	3	2
25	0	0	0	1	0	0	3	2	8	1	4	0	1	1	0	3	3	6	3	3	1
26	0	1	0	0	0	0	0	2	2	5	0	2	0	0	1	0	4	4	0	2	1
27	3	0	0	0	2	2	1	0	3	1	0	0	0	0	0	1	0	1	1	0	3
28	0	0	0	0	0	2	2	2	0	0	1	2	0	0	0	0	0	2	1	2	0
29	0	0	0	0	0	0	4	0	1	0	0	1	0	0	0	0	0	0	0	0	0
30	1	0	0	0	0	0	0	2	3	1	1	0	2	0	0	2	1	1	3	2	1
31	20	0	0	0	0	0	0	1	0	0	1	0	0	0	0	5	9	6	9	4	27

Table 21.

Historical Officer Strength for Commander (O-5) to Fail Officer Select (FOS) to O-6

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O5 FOS to O-6 by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	4	6	3	2	2	1
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
16	3	9	0	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0
17	0	5	9	1	0	0	0	0	1	2	1	0	0	1	1	0	0	0	0	0	0
18	1	0	4	12	3	2	3	0	0	1	2	0	0	0	1	1	0	0	0	0	0
19	5	3	1	5	12	2	2	4	0	0	3	1	0	4	9	15	4	9	3	4	8
20	102	69	68	7	7	121	4	3	2	1	7	27	22	48	50	32	46	31	62	65	56
21	314	345	293	253	194	126	157	139	118	152	117	184	180	216	215	189	179	187	189	226	252
22	230	224	201	210	198	240	172	191	133	127	171	103	200	204	154	172	161	217	185	154	177
23	170	173	152	143	161	148	163	120	149	104	91	124	78	154	177	140	138	99	136	116	103
24	110	133	121	107	103	114	104	125	79	114	77	60	89	63	117	140	106	75	56	99	77
25	42	77	79	79	75	68	71	83	89	51	81	58	42	73	46	91	104	60	45	37	60
26	17	9	13	12	12	15	13	25	21	16	13	40	14	6	21	15	47	51	27	17	28
27	6	4	4	3	4	3	10	13	9	7	8	6	26	8	3	10	10	38	44	18	13
28	4	2	4	1	3	3	2	5	5	6	5	4	4	20	6	1	8	4	30	35	15
29	1	4	0	0	0	2	2	2	2	1	4	3	3	2	12	5	0	5	3	24	31
30	4	4	4	4	3	3	4	5	2	1	2	4	2	5	3	8	6	7	8	8	29
31	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2

Table 22.

Historical Officer Strength for Captain (O-6)

OPIS ALNAV less Warrants & TARS Inventory: Inventory Values for Designator=Total Navy+Unk
Grade=O-6 by YCS
SOURCE: FAIMO-NPRDC

YCS/FY	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0	0	0	0	0	0	0	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0
1	0	4	2	3	2	2	3	1	1	1	0	1	0	0	0	40	40	39	31	18	13
2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
14	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
16	0	11	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0
17	4	1	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
18	4	1	1	6	0	0	0	0	0	0	1	0	0	2	1	1	0	0	0	0	0
19	5	3	23	4	5	1	3	8	3	1	0	7	7	7	19	30	10	30	17	18	18
20	202	72	169	50	8	8	15	29	34	10	13	47	43	70	87	104	113	47	134	180	95
21	593	669	528	523	343	236	270	330	359	303	236	334	354	438	476	358	406	357	385	510	557
22	566	587	646	582	589	624	588	542	464	514	500	410	545	457	450	527	432	577	553	465	553
23	480	543	541	597	519	580	585	571	543	456	497	517	413	568	512	468	548	432	560	543	464
24	487	445	481	499	534	470	514	623	516	488	404	464	484	399	533	462	449	521	387	488	477
25	274	424	384	433	436	458	400	461	565	472	437	375	423	432	356	468	418	410	437	332	421
26	270	232	320	321	359	338	364	347	393	508	420	382	320	376	372	309	406	309	302	323	274
27	217	213	161	262	251	266	278	304	278	321	422	335	323	265	311	305	260	270	246	222	253
28	229	155	143	117	198	189	217	222	241	222	255	332	258	264	200	247	243	165	215	200	169
29	233	163	79	98	79	139	142	169	167	190	175	186	248	194	202	140	183	138	115	166	165
30	142	162	121	113	123	107	156	191	221	228	238	226	219	251	270	301	268	226	222	208	289
31	5	0	0	0	0	1	0	0	0	0	1	0	0	0	3	5	9	2	7	2	15

APPENDIX B. OFFICER PROMOTION RATES AND TIMING[5]

Table 23.

Historical "Due Course" Promotion Rates and Average Flow Points for Unrestricted Line (URL) Navy Officers

URL	CAPTAIN		COMMANDER		LIEUTENANT CDR	
Fiscal Year	Percentage	Avg. Time	Percentage	Time	Percentage	Time
56	79	18-06	80	13-00	90	11-00
57	70	18-06	70	14-00	85	11-06
58	65	18-06	60	14-06	80	11-00
59	46	18-06	27	15-00	80	10-06
60	42	18-00	44	15-06	95	10-00
61	42	19-00	53	16-00	107	10-00
62	40	20-00	70	16-00	95	10-00
63	40	20-00	75	16-00	90	9-06
64	44	21-00	75	15-06	90	9-06
65	44	21-00	75	15-06	90	9-06
66	44	21-00	75	14-06	90	9-06
67	60	21-06	75	14-06	85	9-00
68	60	21-06	75	14-06	85	9-00
69	65	20-06	75	14-00	85	9-00
70	60	20-06	75	14-00	85	8-06
71	60	20-06	75	14-00	85	8-00
72	60	20-06	75	14-00	90	8-00
73	60	20-06	70	15-00	75	8-00
74	60	20-06	70	15-00	75	8-06
75	60	20-06	70	15-06	75	9-00
76	60	21-00	70	15-06	75	9-00
77	60	21-00	70	15-06	80	9-06
78	60	21-06	70	15-06	85	9-06
79	60	21-06	70	14-09	97	9-04
80	62.5	21-09	80	14-09	90	9-03
81	70	21-05	85	14-08	95	9-00
82	70	21-05	85	14-10	95	9-00
83	60	21-06	80	14-11	90	9-01
84	60	21-06	80	15-00	85	9-03
85	60	21-06	75	15-01	85	9-03
86	55	21-03	75	15-02	85	9-06
87	55	21-00	70	15-03	80	9-08
88	55	21-01	70	15-02	80	9-09
89	55	21-02	70	15-03	80	9-11
90	55	21-05	70	15-04	80	10-00
91	55	21-09	70	15-01	80	10-01
92	55	21-06	70	15-02	80	10-03
93	55	21-02	70	15-01	80	10-05
94	55	21-00	65	15-02	70	10-06
95	50	21-02	70	15-04	70	10-03

Table 24.

Projected "Due Course" Promotion Rates and Average Flow Points for Unrestricted Line (URL) for Fiscal Years 1996-2001.

URL	CAPTAIN		COMMANDER		LIEUTENANT CDR	
Fiscal Year	Percentage	Avg. Time	Percentage	Time	Percentage	Time
96	50	21-05	70	15-04	70	10-02
97	50	21-04	70	15-09	70	10-04
98	50	21-04	70	16-00	70	10-08
99	50	21-07	70	16-03	70	10-10
00	50	21-09	70	16-04	70	11-00
01	50	22-01	70	16-05	70	11-01

Table 25.

Historical In-Zone, Below-Zone, and Above-Zone Promotions, Rates, and Average Flow Points for Unrestricted Line (URL) Officers: Fiscal Years 1992-1995.

	In-Zone			Below-Zone			Above-Zone			
	# Selected	# Eligible	% Selected	# Selected	# Eligible	% Selected	# Selected	# Eligible	% Selected	In-Zone Flowpoint
FY 1995										
O-6	160	338	47.3%	7	756	0.9%	2	300	0.7%	21-02
O-5	331	522	63.4%	13	1103	1.2%	21	328	6.2%	15-04
O-4	773	1168	66.2%	11	1230	0.9%	34	392	8.7%	10-03
O-3	2159	2183	98.9%	N/A	N/A	N/A	13	18	72.2%	4-00
FY 1994										
O-6	204	455	44.8%	22	823	2.7%	2	516	0.4%	21-00
O-5	696	1069	65.1%	29	1266	2.3%	23	1150	2.0%	15-02
O-4	1182	1713	69.0%	10	1324	0.8%	7	284	2.5%	10-06
O-3	2357	2484	94.9%	N/A	N/A	N/A	3	20	15.0	4-00
FY 1993										
O-6	225	458	49.1%	17	997	1.7%	10	589	1.7%	21-02
O-5	345	545	63.3%	1	1145	0.1%	10	1345	0.7%	15-01
O-4	762	1111	68.6%	15	2356	0.6%	1	229	0.4%	10-05
O-3	2834	3002	94.4%	N/A	N/A	N/A	20	104	19.2%	4-00
FY 1992										
O-6	370	707	52.3%	12	1276	0.1%	5	578	1.2%	21-05
O-5	710	1032	68.8%	7	2125	0.3%	7	1332	0.4%	15-02
O-4	815	1098	74.2%	33	3150	1.0%	30	320	9.4%	10-03
O-3	3205	3046	94.1%	N/A	N/A	N/A	31	95	32.6%	4-00

APPENDIX C. NAVY OFFICER CONTINUATION RATES[6]

Table 26.

Continuation Rates for Unrestricted Line (URL) for Fiscal Year 1995.†

Year Group	Beginning FY Inventory	Ending FY Inventory	Continuation Rate
94	99	82	82.8
93	215	201	93.4
92	848	812	95.7
91	1952	1743	89.2
90	2374	2066	87.0
89	2271	2056	90.5
88	2009	1625	80.8
87	1971	1543	78.2
86	1612	1291	80.0
85	1470	1313	89.3
84	1038	876	84.3
83	1024	854	83.3
82	996	951	95.4
81	962	939	97.6
80	960	922	96.0
79	870	728	83.6
78	595	563	94.6
77	667	609	91.3
76	526	460	87.4
75	637	423	66.4
74	510	329	64.5
73	412	309	75.0
72	266	220	82.7
71	251	158	62.9
70	231	151	65.5
69	196	133	67.8
68	125	83	66.4
67	123	84	68.2
66	64	34	53.1
65	59	15	25.4
64	18	5	27.7
63	4	2	50.0

†: as of 10/10/95. Included here to illustrate how officer inventory is routinely used by military personnel managers to compute continuation rates.

Table 27.

Historical Continuation Rates for Unrestricted Line (URL) Ensigns (O-1)

OPIS CONTINUATION RATES: ALL NAVY LESS TARS AND WARRANTS FOR TYPE OF LOSS=TOTAL STRENGTH LOSSES
DESIGNATOR=UNRESTRICTED LINE
GRADE=ENS BY YCS
CONTINUATION BY FISCAL YEAR

FY/YCS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
75	0.964932	0.97895	1	1	1	1	1	1	1	1	1	1	1	1	1	1
76	0.999117	0.965081	1	1	1	1	1	1	1	1	1	1	1	1	1	1
77	0.999431	0.976182	0.6	1	1	1	1	1	1	1	1	1	1	1	1	1
78	0.995001	0.982359	0.625	0.666667	1	1	1	1	1	1	1	1	1	1	1	1
79	0.99936	0.989691	0.8	0.666667	1	1	1	1	1	1	1	1	1	1	1	1
80	1	0.992649	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1
81	0.99918	0.990119	0.875	0.75	1	1	1	1	1	1	1	1	1	1	1	1
82	0.999488	0.987583	0.789474	0.666667	1	1	1	1	1	1	1	1	0	1	1	1
83	0.998706	0.9684	0.3	0.555556	0.5	1	1	1	1	1	1	1	1	1	1	1
84	0.999449	0.979974	0.555556	0.75	1	1	1	1	1	1	1	1	1	1	1	1
85	0.998087	0.980661	0.571429	0.5	1	1	0	1	1	1	1	1	1	1	1	1
86	0.999544	0.98782	0.4	1	1	0	1	1	1	1	1	1	1	1	1	1
87	0.997819	0.975365	0.8	0.75	1	0.5	1	1	1	1	1	1	1	1	1	1
88	1	0.979061	0.666667	0	1	0	1	1	1	1	1	1	1	1	1	1
89	0.999703	0.988665	0.2	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	0.990988	0.958333	0.8	1	1	1	1	0	1	1	1	1	1	1	1
91	1	0.973669	0.785714	0.666667	1	1	1	1	1	1	1	1	1	1	1	1
92	1	0.976809	0.818182	0.666667	1	1	1	1	1	1	1	1	1	1	1	1
93	1	0.969959	0.744681	0	1	1	1	1	1	1	1	1	1	1	1	1
94	1	0.954652	0.545455	1	1	1	1	1	1	1	1	1	1	1	1	1
95	1	0.984701	0.333333	0	0	1	1	1	1	1	1	1	1	1	1	1

Table 28.

Historical Continuation Rates for Unrestricted Line (URL) Lieutenants JG (O-2)

OPIS CONTINUATION RATES: ALL NAVY LESS TARS AND WARRANTS FOR TYPE OF LOSS=TOTAL STRENGTH LOSSES
DESIGNATOR=UNRESTRICTED LINE
GRADE= LTJG BY YCS
CONTINUATION BY FISCAL YEAR

FY/YCS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
75	1	0	0.791332	0.863578	0.310345	1	0	1	1	1	1	1	1	1	1	1
76	1	0.142857	0.839197	0.84248	0.173913	0	1	1	1	1	1	1	1	1	1	1
77	1	0.923611	0.934913	0.862454	0.117647	1	1	1	1	1	1	1	1	1	1	1
78	1	0.961131	0.955739	0.88587	0.255556	1	1	1	1	1	1	1	1	1	1	1
79	1	0.974537	0.978513	0.877899	0.272727	1	1	1	1	1	1	1	1	1	1	1
80	1	0.5	0.975323	0.880138	0.224719	0.5	1	1	1	1	1	1	1	1	1	1
81	1	0	0.979592	0.90965	0.666667	0.5	1	1	1	1	1	1	1	1	1	1
82	1	0.166667	0.972555	0.911626	0.5625	1	0.666667	1	1	1	1	1	1	1	0.5	1
83	1	0	0.9557	0.913746	0.576923	0.666667	1	1	1	1	1	1	1	1	1	1
84	1	0	0.966605	0.866747	0.25	0.75	1	1	0	1	1	1	1	1	1	1
85	1	1	0.966477	0.870959	0.791667	1	1	1	1	1	1	1	1	1	1	1
86	1	1	0.966292	0.874224	0.892216	0	0	1	1	1	0	1	1	1	1	1
87	1	1	0.959606	0.87465	0.291139	0.666667	1	1	1	1	1	1	1	1	1	1
88	1	0	0.965314	0.885081	0.618321	1	1	1	1	0	1	1	1	1	1	1
89	1	1	0.981066	0.873736	0.260417	0	1	1	1	1	1	1	1	1	1	1
90	1	0.727273	0.969048	0.888004	0.367187	0.6	1	1	1	1	1	1	1	1	1	1
91	1	0.6	0.960569	0.858937	0.296875	0.666667	1	1	1	1	1	1	1	1	1	1
92	1	0.666667	0.960808	0.870848	0.463768	0.666667	1	1	1	1	1	1	1	1	1	1
93	1	0.857143	0.95083	0.863142	0.395062	1	1	1	1	1	1	1	1	1	1	1
94	1	0.818182	0.931246	0.862912	0.72	0.333333	1	1	1	1	1	1	1	1	1	1
95	1	1	0.978387	0.920464	0.5	0.25	0	1	1	1	1	1	1	1	1	1

Table 29.

Historical Continuation Rates for Unrestricted Line (URL) Lieutenants (O-3)

OPIS CONTINUATION RATES: ALL NAVY LESS TARS AND WARRANTS FOR TYPE OF LOSS=TOTAL STRENGTH LOSSES
DESIGNATOR=UNRESTRICTED LINE
GRADE= LT BY YCS
CONTINUATION BY FISCAL YEAR

FY/YCS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
75	1	1	0	0.020408	0.851999	0.876548	0.911315	0.948117	0.856999	0.256881	0.125	0.5	0	0	0	1
76	1	0	1	0.076923	0.807304	0.824313	0.852459	0.919388	0.942073	0.366548	0.652174	0.75	0.3	1	1	1
77	1	1	1	0.125	0.822928	0.819411	0.83778	0.899285	0.945411	0.619965	0.518519	0.6	0	1	1	1
78	1	1	1	0.89049	0.80801	0.751043	0.789926	0.841176	0.899045	0.752608	0.423529	0.555556	0.2	1	1	1
79	1	0	1	0.901734	0.84021	0.80721	0.822825	0.882306	0.910112	0.778986	0.524194	0.769231	0.5	0	1	1
80	1	1	1	0.852941	0.827679	0.838725	0.833222	0.893449	0.927442	0.836245	0.5	0.272727	0	0.5	1	1
81	1	1	1	0.875486	0.875542	0.849738	0.859494	0.935458	0.916145	0.527132	0.515152	0.625	0.5	1	1	1
82	1	1	1	0.136364	0.897324	0.860759	0.883429	0.929861	0.946588	0.840426	0.789474	0.5	0.2	1	1	1
83	1	0	1	0.133333	0.899662	0.897299	0.892672	0.936884	0.942708	0.559322	0.380952	0.615385	0.6	1	0.5	1
84	1	1	1	0	0.895281	0.898188	0.874512	0.917755	0.961011	0.538922	0.666667	0.625	0.5	1	1	0
85	1	1	1	1	0.897252	0.888801	0.823529	0.872459	0.937269	0.691011	0.458333	0.571429	0.5	1	0	1
86	1	1	1	1	0.916552	0.896056	0.833487	0.877663	0.926036	0.742459	0.5	0.8	0	0	1	1
87	1	1	1	0.862069	0.910984	0.874096	0.843499	0.880182	0.928264	0.863354	0.339623	1	0	1	1	0
88	1	1	1	0.8	0.909677	0.899445	0.836665	0.885236	0.928048	0.894737	0.21519	0.555556	0.25	1	1	1
89	1	1	1	1	0.882633	0.919461	0.840202	0.8697	0.94021	0.906772	0.212766	0.555556	0	1	1	1
90	1	0.5	1	1	0.889813	0.908764	0.845663	0.836299	0.922984	0.956429	0.52819	0.555556	0.67	1	1	1
91	1	0.2	1	1	0.850564	0.881379	0.840668	0.825413	0.903969	0.949096	0.305949	0.265306	0.5	1	1	1
92	1	0.6	1	1	0.862669	0.905552	0.855033	0.838868	0.895713	0.957676	0.545611	0.233333	0.58	1	1	1
93	1	0.5	1	1	0.848507	0.905156	0.867569	0.813899	0.877536	0.917972	0.613139	0.158537	0.2	0.3	1	1
94	1	0.2	1	0.783784	0.833333	0.903267	0.836638	0.757692	0.845974	0.896251	0.720177	0.072464	0.167	1	1	1
95	1	0.7	1	0.913462	0.890909	0.939127	0.84092	0.822713	0.860931	0.937282	0.81677	0.188976	0.5	1	1	0

Table 30.

Historical Continuation Rates for Unrestricted Line (URL) Lieutenant Commanders (O-4)

OPIS CONTINUATION RATES: ALL NAVY LESS TARS AND WARRANTS FOR TYPE OF LOSS=TOTAL STRENGTH LOSSES
DESIGNATOR=UNRESTRICTED LINE
GRADE= LCDR BY YCS
CONTINUATION BY FISCAL YEAR

FY/YCS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
75	0.3	1	1	0.5	1	1	0	1	0.98	0.978908	0.974549	0.97526	0.980498	0.986395	0.983418	0.97561	0.943522	0.907749	0.798851	0.092857	0.058824
76	0	0	1	1	0	1	1	1	0.99	0.959877	0.979747	0.971397	0.971774	0.988938	0.98743	0.981667	0.984436	0.886029	0.776423	0.10219	0
77	1	0	1	1	1	1	1	1	1	0.968421	0.975	0.979058	0.974857	0.977528	0.979263	0.959375	0.960474	0.947368	0.763485	0.07772	0.071429
78	1	1	1	1	1	1	1	1	1	0.93633	0.958918	0.963139	0.965054	0.973778	0.968981	0.940447	0.956522	0.916667	0.800948	0.121547	0.1
79	1	1	1	1	1	1	1	1	1	0.925834	0.930845	0.947479	0.967941	0.976157	0.984828	0.961165	0.971545	0.913876	0.78972	0.285714	0.272727
80	1	1	1	1	1	1	0	1	0.5	0.937238	0.930481	0.943956	0.960265	0.968274	0.978862	0.962547	0.962733	0.930736	0.789474	0.178571	0.8125
81	1	0	1	1	1	1	1	1	0.96	0.950113	0.947739	0.966919	0.969303	0.979976	0.986813	0.948357	0.972727	0.882353	0.886256	0.260274	0.5625
82	1	1	1	1	1	1	1	1	0.94	0.961343	0.96648	0.974066	0.967339	0.982005	0.97379	0.969325	0.948864	0.966825	0.804511	0.297297	0.486486
83	1	1	1	1	1	1	1	1	0.97	0.98006	0.967245	0.965476	0.984093	0.982161	0.977072	0.96875	0.932886	0.885542	0.778325	0.158879	0.222222
84	1	1	0	1	1	1	1	1	0.95	0.984085	0.977799	0.982706	0.968672	0.975956	0.97541	0.96	0.985915	0.948905	0.731034	0.163522	0.235294
85	1	1	1	1	1	1	1	1	1	0.975845	0.97791	0.972277	0.966562	0.975098	0.977299	0.956098	0.985075	0.894737	0.742187	0.147059	0.041667
86	1	1	1	1	1	1	1	1	1	0.953901	0.956796	0.960242	0.96827	0.976009	0.969904	0.92887	0.983607	0.969231	0.711864	0.138298	0.357143
87	1	1	1	1	1	1	1	0	1	0.971429	0.969753	0.968597	0.972452	0.97672	0.978211	0.944724	0.960396	0.961111	0.854839	0.214286	0.615385
88	1	1	1	1	1	1	1	1	1	0.965854	0.954736	0.960937	0.977249	0.975	0.974625	0.913669	0.987578	0.988889	0.833333	0.228571	0.333333
89	1	1	1	1	1	1	1	1	1	0.98008	0.974798	0.953778	0.970681	0.974386	0.974722	0.925424	0.943231	0.980645	0.795455	0.158273	0.583333
90	1	0	1	1	1	1	1	1	1	1	0.979123	0.953368	0.949674	0.96129	0.965971	0.917595	0.960784	0.916279	0.788079	0.079137	0.428571
91	1	0	1	1	0	1	1	1	0.73	1	0.982932	0.953096	0.969027	0.978852	0.95858	0.85342	0.927336	0.892116	0.787565	0.07563	0.727273
92	1	0.6	1	1	0.8	1	1	1	1	1	0.978211	0.969201	0.969215	0.981417	0.967471	0.84965	0.942478	0.952756	0.784038	0.126667	0.666667
93	1	0.7	1	1	1	1	1	1	1	0.5	0.976339	0.965284	0.954023	0.961698	0.969697	0.901176	0.95614	0.90566	0.688797	0.11976	0.157895
94	1	0.5	1	1	1	1	1	1	1	1	0.975881	0.960728	0.972946	0.975758	0.928183	0.095023	0.068548	0.059908	0.057292	0.060606	0.2
95	1	0.5	1	1	1	1	1	1	1	1	0.973262	0.972973	0.969758	0.980352	0.966736	0.741617	0.454545	0.538462	0.333333	0.181818	0.2

Table 31.

Historical Continuation Rates for Unrestricted Line (URL) Commanders (O-5)

OPIS CONTINUATION RATES: ALL NAVY LESS TARS AND WARRANTS FOR TYPE OF LOSS=TOTAL STRENGTH LOSSES
DESIGNATOR=UNRESTRICTED LINE
GRADE= CDR BY YCS
CONTINUATION BY FISCAL YEAR

YCS/FY	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	UNK
75	1	0.99	0.976562	0.983452	0.951657	0.926164	0.919708	0.803419	0.765432	0.813433	0.717391	0.142857	0	0	1	1	1	0.5
76	1	0.994475	0.987805	0.9776	0.947305	0.900147	0.877698	0.763265	0.72619	0.775	0.614679	0.136364	0	1	1	1	1	1
77	1	1	0.989111	0.97479	0.944715	0.910714	0.90636	0.759434	0.732484	0.705882	0.677778	0.074627	0	1	1	1	1	1
78	1	0.991304	0.979839	0.968519	0.937901	0.889081	0.900862	0.774908	0.727848	0.763158	0.702381	0.065574	0	1	1	1	1	1
79	0.968421	0.993318	0.980165	0.985477	0.94697	0.897494	0.904382	0.861915	0.802632	0.741071	0.670588	0.169492	0	1	1	1	1	1
80	1	0.985321	0.973196	0.974958	0.955696	0.871486	0.875318	0.846966	0.719101	0.716667	0.666667	0.140351	0.7	1	1	1	1	1
81	0.990228	0.983471	0.977312	0.980932	0.956376	0.899563	0.910588	0.872587	0.777778	0.789062	0.790698	0.285714	0.5	0.5	0	1	1	1
82	0.997085	0.984326	0.970297	0.974958	0.948956	0.900901	0.886598	0.863158	0.764706	0.682353	0.696078	0.202899	0.294118	0.33	0.67	1	1	1
83	1	0.992424	0.984424	0.97992	0.956897	0.87931	0.92887	0.895105	0.81	0.733333	0.719298	0.125	0.071429	0.25	0	0.33	1	1
84	0.992278	0.995153	0.989899	0.979167	0.936475	0.901818	0.879888	0.827839	0.719512	0.746667	0.666667	0.170732	0.111111	0	0.5	1	1	1
85	1	0.996241	0.983766	0.985401	0.937397	0.877462	0.85041	0.802139	0.760684	0.661017	0.767857	0.1	0	0	1	1	0.5	0
86	1	0.995298	0.988848	0.986777	0.939259	0.849823	0.866162	0.811475	0.79661	0.722222	0.74359	0.162791	0.333333	1	1	1	0.5	1
87	1	0.994329	0.995536	0.971795	0.951096	0.841017	0.895966	0.834356	0.707071	0.804348	0.8	0.103448	0.142857	0	1	1	0.5	1
88	0.977273	0.996485	0.998211	0.980597	0.949735	0.810376	0.867308	0.726667	0.762887	0.71875	0.694444	0.188679	0	1	1	1	0	1
89	1	0.998374	0.998308	0.981481	0.947612	0.830056	0.867749	0.785714	0.771429	0.805556	0.717391	0.083333	0.2	1	1	1	1	1
90	1	0.998217	0.998384	0.979522	0.94697	0.842365	0.877622	0.77	0.791667	0.734177	0.724138	0.064516	0.5	0.5	1	0	0	1
91	1	0.991259	1	0.970405	0.95122	0.873747	0.905622	0.790323	0.537736	0.478261	0.5	0.170732	0.5	0	0	1	1	0.5
92	1	1	0.980456	0.985836	0.94391	0.892139	0.856148	0.766026	0.592593	0.5	0.545455	0.107143	0.714286	1	1	1	1	0.33
93	1	0.998124	0.971171	0.981481	0.932374	0.865188	0.825726	0.738636	0.583333	0.670886	0.444444	0.26087	0.666667	0.4	0	1	1	0.25
94	1	0.991349	0.96988	0.945386	0.928788	0.769592	0.767981	0.291971	0.414634	0.214286	0.113208	0.083333	0	0	1	1	1	0
95	1	0.997222	0.977509	0.942724	0.914343	0.731588	0.716387	0.209091	0.16129	0.151515	0.083333	0.142857	0	1	1	0	1	0.5

Table 32.

Historical Continuation Rates for Unrestricted Line (URL) Captains (O-6)

OPIS CONTINUATION RATES: ALL NAVY LESS TARS AND WARRANTS FOR TYPE OF LOSS=TOTAL STRENGTH LOSSES
DESIGNATOR=UNRESTRICTED LINE
GRADE= CAPT BY YCS
CONTINUATION BY FISCAL YEAR

FY/YCS	18	19	20	21	22	23	24	25	26	27	28	29	30	UNK
75	1	1	0.992063	0.943925	0.959248	0.943182	0.891304	0.90625	0.768	0.758621	0.741935	0.088435	0.166667	0.666667
76	1	1	1	0.938272	0.909091	0.90228	0.897119	0.806931	0.777778	0.648936	0.519608	0.044643	0.071429	1
77	1	1	0.975	0.951807	0.91601	0.911032	0.913357	0.908654	0.834395	0.78125	0.59322	0.137255	0.333333	1
78	1	1	1	0.950725	0.857595	0.891738	0.890625	0.891566	0.828571	0.730159	0.647887	0.085714	0.25	1
79	1	1	1	0.989637	0.875648	0.90146	0.871383	0.811404	0.77619	0.769784	0.7	0.065217	0	1
80	1	1	1	0.967391	0.908397	0.889213	0.8583	0.836431	0.814607	0.84106	0.737374	0.145161	0	1
81	1	1	1	0.988889	0.958333	0.915966	0.911475	0.890476	0.897196	0.859155	0.793388	0.216216	0.333333	1
82	1	1	1	0.994792	0.960784	0.898917	0.909639	0.867159	0.885246	0.79558	0.715517	0.358696	0.157895	1
83	1	1	1	0.991111	0.92126	0.900398	0.928287	0.914191	0.893333	0.866667	0.8	0.2625	0.131579	1
84	1	1	1	0.988439	0.950355	0.893536	0.873874	0.923404	0.873646	0.873684	0.728814	0.27451	0.275862	1
85	1	1	1	0.992701	0.996491	0.94052	0.940171	0.881443	0.837963	0.831169	0.754967	0.247059	0.151515	1
86	1	1	1	1	0.995614	0.954386	0.92549	0.872146	0.871345	0.796407	0.774725	0.227273	0.2	1
87	1	1	0.857143	1	0.992806	0.960699	0.900735	0.919492	0.868421	0.855072	0.746032	0.320896	0.275862	1
88	1	1	1	0.99639	0.995434	0.93617	0.93722	0.884298	0.883721	0.8125	0.790909	0.348315	0.23913	1
89	1	1	1	0.996429	0.996296	0.935897	0.914397	0.889423	0.880952	0.846154	0.775	0.238095	0.45	1
90	1	1	1	0.994924	0.993691	0.955056	0.908676	0.888412	0.871508	0.885714	0.783217	0.290698	0.305556	0.5
91	1	1	0.933333	0.989637	0.992032	0.964286	0.92549	0.651282	0.637255	0.573333	0.534722	0.163462	0.1875	0
92	1	1	1	1	0.975078	0.900794	0.857143	0.739316	0.782258	0.844828	0.734177	0.323529	0.277778	1
93	1	1	1	0.990431	0.989399	0.855305	0.876106	0.730909	0.778443	0.846154	0.804348	0.314815	0.333333	1
94	1	1	0.986842	0.992308	0.97992	0.85159	0.790262	0.629442	0.695431	0.621849	0.8	0.343284	0.208333	1
95	1	1	1	0.990228	0.933852	0.757202	0.732218	0.724638	0.75	0.801587	0.590909	0.280702	0.4	0.666667

APPENDIX D. MILITARY OFFICER PAY AND ALLOWANCE COST FACTORS[7]

Table 33.

Military Officer Pay and Allowance Cost Factors for Fiscal Years 1995 through 2001 Based on the Presidential Budget for Fiscal Year 1997

GRADE	O-1	O-2	O-3	O-4	O-5	O-6
FY95	$ 36,406	$ 48,305	$ 60,952	$ 74,069	$ 89,640	$ 108,233
FY96	$ 36,924	$ 48,823	$ 61,639	$ 74,804	$ 90,556	$ 109,488
FY97	$ 37,947	$ 50,118	$ 63,229	$ 76,809	$ 92,999	$ 109,488
FY98	$ 39,202	$ 51,247	$ 64,831	$ 78,733	$ 95,362	$ 109,488
FY99	$ 40,253	$ 52,492	$ 66,318	$ 80,496	$ 97,548	$ 118,790
FY00	$ 41,318	$ 53,691	$ 67,842	$ 82,290	$ 99,794	$ 118,790
FY01	$ 42,711	$ 55,259	$ 69,845	$ 84,670	$ 102,780	$ 125,818

Table 34.

Projected Rate Increases and Average Increase for Pay and Allowance Rates: Fiscal Years 1996 Through 2001

Grade	O-1	O-2	O-3	O-4	O-6	O-6
FY96	0.014228	0.010724	0.011271	0.009923	0.010219	0.011595
FY97	0.027706	0.026524	0.025795	0.026803	0.026978	0
FY98	0.033072	0.022527	0.025336	0.025049	0.025409	0
FY99	0.02681	0.024294	0.022937	0.022392	0.022923	0.084959
FY00	0.026458	0.022842	0.02298	0.022287	0.023025	0
FY01	0.033714	0.029204	0.029524	0.028922	0.029922	0.059163
Average	0.026998	0.022686	0.022974	0.022563	0.023079	0.025953

Table 35.

Projected officer pay and allowance cost factors for FY02-FY05 based on the average percent increases determined from the FY97 Presidential Budget.

GRADE	O-1	O-2	O-3	O-4	O-5	O-6
FY02	$ 43,864	$ 56,513	$ 71,450	$ 86,580	$ 105,152	$ 129,083
FY03	$ 45,048	$ 57,795	$ 73,091	$ 88,534	$ 107,579	$ 132,433
FY04	$ 46,265	$ 59,106	$ 74,770	$ 90,531	$ 110,062	$ 135,870
FY05	$ 47,514	$ 60,447	$ 76,488	$ 92,574	$ 112,602	$ 139,397

APPENDIX E. NAVY PROFESSIONAL MILITARY EDUCATION THROUGHPUT AND JOINT DUTY ASSIGNMENTS[8]

FY 96 Estimated Professional Military Education Opportunity for Navy Officers by Community (draft)

Intermediate Level: Grades O-4 (Sel) and O-4	URL	RL/STAFF	TOTAL
Naval War College	112	51	163
Air Command and Staff College	29	6	35
Army Command and Staff College	34	14	48
Marine Command and Staff College	14	11	25
Foreign War Colleges	11	0	11
TOTAL	200	82	282
Joint Duty Assignment List Billets	324	258	

Senior Level: Grades O-5 and O-6	URL	RL/STAFF	TOTAL
Naval War College	85	26	111
Air War College	12	3	15
Army War College	6	3	9
Marine Top Level School	2	0	2
Industrial College of the Armed Forces (ICAF)	25	18	43
National War College	24	6	30
Foreign War Colleges	8	0	8
TOTAL	162	56	218
Joint Duty Assignment List Billets: O-5/O-6	381/202	200/123	

APPENDIX F. ILLUSTRATIVE SESSION WITH THE NAVY OFFICER DECISION SUPPORT SYSTEM

Page 1

Navy Officer Forecasting Model
Unrestricted Line (URL)

05/27/96 05:24 PM

LTC Mike McGinnis
Operations Research Center
USMA, West Point, NY 10996
DSN 688 - 2700. Email: fm0768@se.usma.edu

YEAR 0: 1995 **TO** **YEAR 10: 2005**

User Help Menu

Ctrl-E	Enter Inputs	Ctrl-R	View Results
Ctrl-G	Graph results	Ctrl-U	Update years from t to t+1
Crtl-V	View worksheet	Ctrl-S	Save the file
Ctrl-P	Print results	Ctrl-Q	Save and quit

Select a program option

TO ESCAPE A PROGRAM, PRESS [ESC] KEY TWICE

APPENDIX F. (continued)

MODEL INPUTS:

Page 2

Unrestricted Line (URL) Ensign Accessions

YR	FY	Ensigns
1	1996	2238
2	1997	2238
3	1998	2238
4	1999	2238
5	2000	2238
6	2001	2238
7	2002	2238
8	2003	2238
9	2004	2238
10	2005	2238

Navy URL Officer Authorizations

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	5075	4379	9857	5256	3591	1631	29789
1996	5007	4215	9577	5165	3502	1586	29052
1997	4730	4032	9030	4967	3387	1560	27706
1998	4481	3943	8870	4868	3320	1549	27031
1999	4409	3989	8957	4897	3322	1541	27115
2000	4341	3992	9001	4901	3318	1541	27094
2001	4341	3992	9001	4901	3318	1541	27094
2002	4341	3992	9001	4901	3318	1541	27094
2003	4341	3992	9001	4901	3318	1541	27094
2004	4341	3992	9001	4901	3318	1541	27094
2005	4341	3992	9001	4901	3318	1541	27094

Cost Factors for Average Officer Pay and Allowances

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT
1995	$36,406	$48,305	$60,952	$74,069	$89,640	$108,233
1996	$36,924	$48,823	$61,639	$74,804	$90,556	$109,488
1997	$37,947	$50,118	$63,229	$76,809	$92,999	$109,488
1998	$39,202	$51,247	$64,831	$78,733	$95,362	$109,488
1999	$40,253	$52,492	$66,318	$80,496	$97,548	$118,790
2000	$41,318	$53,891	$67,842	$82,290	$99,794	$118,790
2001	$42,711	$55,259	$69,845	$84,670	$102,780	$125,818
2002	$42,711	$55,259	$69,845	$84,670	$102,780	$125,818
2003	$42,711	$55,259	$69,845	$84,670	$102,780	$125,818
2004	$42,711	$55,259	$69,845	$84,670	$102,780	$125,818
2005	$42,711	$55,259	$69,845	$84,670	$102,780	$125,818

APPENDIX F. (continued)

Page 3 1995, URL Officer End Strength, Year: 0,

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	1	1996	0	0	0	0	0	1996
1994	2	1640	0	0	0	0	0	1640
1993	3	12	1931	0	0	0	0	1943
1992	4	1	2149	0	0	0	0	2150
1991	5	1	4	2065	0	0	0	2070
1990	6	0	2	1996	0	0	0	1998
1989	7	0	1	1988	0	0	0	1989
1988	8	0	0	1479	0	0	0	1479
1987	9	0	0	1392	0	0	0	1392
1986	10	0	0	1154	0	0	0	1154
1985	11	0	0	256	420	0	0	676
1984	12	0	0	306	289	0	0	595
1983	13	0	0	119	648	0	0	767
1982	14	0	0	4	737	0	0	741
1981	15	0	0	0	822	0	0	822
1980	16	0	0	0	797	8	0	805
1979	17	0	0	0	153	498	0	651
1978	18	0	0	0	9	566	0	575
1977	19	0	0	0	0	495	0	495
1976	20	0	0	0	0	546	0	546
1975	21	0	0	0	0	428	0	428
1974	22	0	0	0	0	373	8	381
1973	23	0	0	0	0	67	249	316
1972	24	0	0	0	0	13	291	304
1971	25	0	0	0	0	5	226	231
1970	26	0	0	0	0	3	167	170
1969	27	0	0	0	0	1	163	164
1968	28	0	0	0	0	0	129	129
1967	29	0	0	0	0	0	80	80
1966	30	0	0	0	0	0	86	86
1965	30+	0	0	0	0	0	46	46
	Totals	3650	4087	10759	3875	3003	1445	26819

1996 URL Promotion Rate MatrixYear 1

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT
1996	1	1	1	1	1	1	1
1995	2	1	1	1	1	1	1
1994	3	0.99	1	1	1	1	1
1993	4	0	1	1	1	1	1
1992	5	0	0.97	1	1	1	1
1991	6	0	0	1	1	1	1
1990	7	0	0	1	1	1	1
1989	8	0	0	1	1	1	1
1988	9	0	0	1	1	1	1
1987	10	0	0	0.07	1	1	1
1986	11	0	0	0.70	1	1	1
1985	12	0	0	0.03	1	1	1
1984	13	0	0	1	1	1	1
1983	14	0	0	1	1	1	1
1982	15	0	0	1	1	1	1
1981	16	0	0	1	0.07	1	1
1980	17	0	0	1	0.70	1	1
1979	18	0	0	1	0.03	1	1
1978	19	0	0	1	1	1	1
1977	20	0	0	1	1	1	1
1976	21	0	0	1	1	1	1
1975	22	0	0	1	1	0.02	1
1974	23	0	0	1	1	0.50	1
1973	24	0	0	1	1	0.01	1
1972	25	0	0	1	1	0.01	1
1971	26	0	0	1	1	1	1
1970	27	0	0	1	1	1	1
1969	28	0	0	1	1	1	1
1968	29	0	0	1	1	1	1
1967	30	0	0	1	1	1	1
1966	30+	0	0	1	1	1	1

APPENDIX F. (continued)

Page 4. 1996. URL Transition End Strength. Year 1

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	Total
1996	1	2238	0	0	0	0	0	2238
1995	2	1996	0	0	0	0	0	1996
1994	3	16	1624	0	0	0	0	1640
1993	4	12	1931	0	0	0	0	1943
1992	5	1	64	2085	0	0	0	2150
1991	6	1	0	2065	0	0	0	2066
1990	7	0	2	1996	0	0	0	1998
1989	8	0	1	1988	0	0	0	1989
1988	9	0	0	1479	0	0	0	1479
1987	10	0	0	1295	97	0	0	1392
1986	11	0	0	346	808	0	0	1154
1985	12	0	0	248	428	0	0	676
1984	13	0	0	306	289	0	0	595
1983	14	0	0	119	648	0	0	767
1982	15	0	0	4	737	0	0	741
1981	16	0	0	0	764	58	0	822
1980	17	0	0	0	239	566	0	805
1979	18	0	0	0	148	503	0	651
1978	19	0	0	0	9	566	0	575
1977	20	0	0	0	0	495	0	495
1976	21	0	0	0	0	546	0	546
1975	22	0	0	0	0	419	9	428
1974	23	0	0	0	0	187	195	381
1973	24	0	0	0	0	66	250	316
1972	25	0	0	0	0	13	291	304
1971	26	0	0	0	0	5	226	231
1970	27	0	0	0	0	3	167	170
1969	28	0	0	0	0	1	163	164
1968	29	0	0	0	0	0	129	129
1967	30	0	0	0	0	0	80	80
1966	30+	0	0	0	0	0	86	86
	Totals	4264	3622	11931	4168	3427	1595	29007

1996. URL Continuation Rates. Year 1

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT
1996	1	0.99	1	1	1	1	1
1995	2	0.99	1	1	1	1	1
1994	3	**0.50**	0.99	1	1	1	1
1993	4	**0**	0.99	1	1	1	1
1992	5	**0**	**0.50**	0.99	1	1	1
1991	6	**0**	**0.20**	0.99	1	1	1
1990	7	**0**	**0**	0.80	1	1	1
1989	8	**0**	**0**	0.99	1	1	1
1988	9	**0**	**0**	0.99	1	1	1
1987	10	**0**	**0**	0.90	0.99	1	1
1986	11	**0**	**0**	0.90	0.99	1	1
1985	12	**0**	**0**	**0.70**	0.99	1	1
1984	13	**0**	**0**	**0.50**	0.90	1	1
1983	14	**0**	**0**	**0.30**	0.90	1	1
1982	15	**0**	**0**	**0**	0.99	1	1
1981	16	**0**	**0**	**0**	0.99	0.99	1
1980	17	**0**	**0**	**0**	0.90	0.99	1
1979	18	**0**	**0**	**0**	**0.70**	0.99	1
1978	19	**0**	**0**	**0**	**0.50**	0.99	1
1977	20	**0**	**0**	**0**	**0.30**	0.70	1
1976	21	**0**	**0**	**0**	**0**	0.80	1
1975	22	**0**	**0**	**0**	**0**	0.99	0.99
1974	23	**0**	**0**	**0**	**0**	0.90	0.99
1973	24	**0**	**0**	**0**	**0**	**0.80**	0.90
1972	25	**0**	**0**	**0**	**0**	**0.80**	0.90
1971	26	**0**	**0**	**0**	**0**	**0.80**	0.80
1970	27	**0**	**0**	**0**	**0**	**0.80**	0.80
1969	28	**0**	**0**	**0**	**0**	**0.80**	0.80
1968	29	**0**	**0**	**0**	**0**	**0**	0.80
1967	30	**0**	**0**	**0**	**0**	**0**	0.80
1966	**0**	**0**	**0**	**0**	**0**	**0**	0.80

APPENDIX F. (continued)

Page 5 1996 URL Officer End Strength Year 1

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1996	1	2216	0	0	0	0	0	2216
1995	2	1976	0	0	0	0	0	1976
1994	3	8	1607	0	0	0	0	1616
1993	4	0	1912	0	0	0	0	1912
1992	5	0	32	2064	0	0	0	2096
1991	6	0	0	2044	0	0	0	2044
1990	7	0	0	1597	0	0	0	1597
1989	8	0	0	1968	0	0	0	1968
1988	9	0	0	1464	0	0	0	1464
1987	10	0	0	1165	96	0	0	1262
1986	11	0	0	312	800	0	0	1111
1985	12	0	0	174	423	0	0	597
1984	13	0	0	153	260	0	0	413
1983	14	0	0	36	583	0	0	619
1982	15	0	0	0	730	0	0	730
1981	16	0	0	0	757	57	0	814
1980	17	0	0	0	215	560	0	775
1979	18	0	0	0	104	498	0	601
1978	19	0	0	0	5	560	0	565
1977	20	0	0	0	0	347	0	347
1976	21	0	0	0	0	437	0	437
1975	22	0	0	0	0	415	8	424
1974	23	0	0	0	0	168	193	360
1973	24	0	0	0	0	53	225	278
1972	25	0	0	0	0	10	262	272
1971	26	0	0	0	0	4	181	185
1970	27	0	0	0	0	2	134	136
1969	28	0	0	0	0	1	130	131
1968	29	0	0	0	0	0	103	103
1967	30	0	0	0	0	0	64	64
1966	30+	0	0	0	0	0	69	69
	Totals	4200	3551	10976	3973	3112	1368	27181

1996 Inventory Adjustment Matrix

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1996	1	0	0	0	0	0	0	0
1995	2	0	0	0	0	0	0	0
1994	3	0	0	0	0	0	0	0
1993	4	0	0	0	0	0	0	0
1992	5	0	0	0	0	0	0	0
1991	6	0	0	0	0	0	0	0
1990	7	0	0	0	0	0	0	0
1989	8	0	0	0	0	0	0	0
1988	9	0	0	0	0	0	0	0
1987	10	0	0	0	0	0	0	0
1986	11	0	0	0	0	0	0	0
1985	12	0	0	0	0	0	0	0
1984	13	0	0	0	0	0	0	0
1983	14	0	0	0	0	0	0	0
1982	15	0	0	0	0	0	0	0
1981	16	0	0	0	0	0	0	0
1980	17	0	0	0	0	0	0	0
1979	18	0	0	0	0	0	0	0
1978	19	0	0	0	0	0	0	0
1977	20	0	0	0	0	0	0	0
1976	21	0	0	0	0	0	0	0
1975	22	0	0	0	0	0	0	0
1974	23	0	0	0	0	0	0	0
1973	24	0	0	0	0	0	0	0
1972	25	0	0	0	0	0	0	0
1971	26	0	0	0	0	0	0	0
1970	27	0	0	0	0	0	0	0
1969	28	0	0	0	0	0	0	0
1968	29	0	0	0	0	0	0	0
1967	30	0	0	0	0	0	0	0
1966	30+	0	0	0	0	0	0	0
	Totals	0	0	0	0	0	0	0

APPENDIX F. (continued)

Page 6 1996 Adjusted Officer End Strength Year 1

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1996	1	2216	0	0	0	0	0	2216
1995	2	1976	0	0	0	0	0	1976
1994	3	8	1607	0	0	0	0	1616
1993	4	0	1912	0	0	0	0	1912
1992	5	0	32	2064	0	0	0	2096
1991	6	0	0	2044	0	0	0	2044
1990	7	0	0	1597	0	0	0	1597
1989	8	0	0	1968	0	0	0	1968
1988	9	0	0	1464	0	0	0	1464
1987	10	0	0	1165	96	0	0	1262
1986	11	0	0	312	800	0	0	1111
1985	12	0	0	174	423	0	0	597
1984	13	0	0	153	260	0	0	413
1983	14	0	0	36	583	0	0	619
1982	15	0	0	0	730	0	0	730
1981	16	0	0	0	757	57	0	814
1980	17	0	0	0	215	560	0	775
1979	18	0	0	0	104	498	0	601
1978	19	0	0	0	5	560	0	565
1977	20	0	0	0	0	347	0	347
1976	21	0	0	0	0	437	0	437
1975	22	0	0	0	0	415	8	424
1974	23	0	0	0	0	168	193	360
1973	24	0	0	0	0	53	225	278
1972	25	0	0	0	0	10	262	272
1971	26	0	0	0	0	4	181	185
1970	27	0	0	0	0	2	134	136
1969	28	0	0	0	0	1	130	131
1968	29	0	0	0	0	0	103	103
1967	30	0	0	0	0	0	64	64
1966	30+	0	0	0	0	0	69	69
	Totals	4200	3551	10976	3973	3112	1368	27181

APPENDIX F. (continued)

Page 9 1997 Adjusted Officer End Strength Year 2

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1997	1	2216	0	0	0	0	0	2216
1996	2	2193	0	0	0	0	0	2193
1995	3	10	1937	0	0	0	0	1947
1994	4	0	1591	0	0	0	0	1591
1993	5	0	29	1836	0	0	0	1864
1992	6	0	0	2043	0	0	0	2043
1991	7	0	0	1635	0	0	0	1635
1990	8	0	0	1581	0	0	0	1581
1989	9	0	0	1948	0	0	0	1948
1988	10	0	0	1226	101	0	0	1327
1987	11	0	0	315	903	0	0	1217
1986	12	0	0	212	801	0	0	1013
1985	13	0	0	87	381	0	0	468
1984	14	0	0	46	234	0	0	280
1983	15	0	0	0	577	0	0	577
1982	16	0	0	0	672	51	0	722
1981	17	0	0	0	204	581	0	785
1980	18	0	0	0	146	561	0	707
1979	19	0	0	0	52	493	0	545
1978	20	0	0	0	1	392	0	394
1977	21	0	0	0	0	277	0	277
1976	22	0	0	0	0	424	9	432
1975	23	0	0	0	0	187	214	401
1974	24	0	0	0	0	133	175	308
1973	25	0	0	0	0	42	202	245
1972	26	0	0	0	0	8	210	218
1971	27	0	0	0	0	3	145	148
1970	28	0	0	0	0	2	107	109
1969	29	0	0	0	0	0	104	104
1968	30	0	0	0	0	0	83	83
1967	30+	0	0	0	0	0	51	51
	Totals	4419	3557	10928	4073	3154	1299	27430

APPENDIX F. (continued)

1998 Adjusted Officer End Strength Year 3

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1998	1	2216	0	0	0	0	0	2216
1997	2	2193	0	0	0	0	0	2193
1996	3	11	2150	0	0	0	0	2161
1995	4	0	1917	0	0	0	0	1917
1994	5	0	24	1528	0	0	0	1552
1993	6	0	0	1817	0	0	0	1817
1992	7	0	0	1634	0	0	0	1634
1991	8	0	0	1619	0	0	0	1619
1990	9	0	0	1565	0	0	0	1565
1989	10	0	0	1631	135	0	0	1766
1988	11	0	0	331	950	0	0	1281
1987	12	0	0	214	903	0	0	1117
1986	13	0	0	106	721	0	0	827
1985	14	0	0	26	343	0	0	369
1984	15	0	0	0	232	0	0	232
1983	16	0	0	0	532	40	0	572
1982	17	0	0	0	181	516	0	697
1981	18	0	0	0	139	581	0	720
1980	19	0	0	0	73	555	0	628
1979	20	0	0	0	16	345	0	360
1978	21	0	0	0	0	314	0	314
1977	22	0	0	0	0	269	5	274
1976	23	0	0	0	0	191	218	409
1975	24	0	0	0	0	148	194	342
1974	25	0	0	0	0	106	157	264
1973	26	0	0	0	0	34	162	196
1972	27	0	0	0	0	7	168	174
1971	28	0	0	0	0	3	116	118
1970	29	0	0	0	0	0	86	86
1969	30	0	0	0	0	0	83	83
1968	30+	0	0	0	0	0	66	66
	Totals	4420	4091	10471	4224	3108	1255	27570

APPENDIX F. (continued)

1999 Adjusted Officer End Strength Year 4

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1999	1	2216	0	0	0	0	0	2216
1998	2	2193	0	0	0	0	0	2193
1997	3	11	2150	0	0	0	0	2161
1996	4	0	2128	0	0	0	0	2128
1995	5	0	29	1841	0	0	0	1870
1994	6	0	0	1513	0	0	0	1513
1993	7	0	0	1454	0	0	0	1454
1992	8	0	0	1618	0	0	0	1618
1991	9	0	0	1603	0	0	0	1603
1990	10	0	0	1310	108	0	0	1418
1989	11	0	0	440	1264	0	0	1704
1988	12	0	0	225	950	0	0	1175
1987	13	0	0	107	813	0	0	920
1986	14	0	0	32	649	0	0	681
1985	15	0	0	0	340	0	0	340
1984	16	0	0	0	213	16	0	229
1983	17	0	0	0	144	408	0	552
1982	18	0	0	0	123	516	0	639
1981	19	0	0	0	69	575	0	645
1980	20	0	0	0	22	389	0	411
1979	21	0	0	0	0	276	0	276
1978	22	0	0	0	0	304	6	311
1977	23	0	0	0	0	121	139	260
1976	24	0	0	0	0	151	198	349
1975	25	0	0	0	0	118	175	293
1974	26	0	0	0	0	85	126	211
1973	27	0	0	0	0	27	129	157
1972	28	0	0	0	0	5	134	139
1971	29	0	0	0	0	0	93	93
1970	30	0	0	0	0	0	68	68
1969	30+	0	0	0	0	0	67	67
	Totals	4420	4307	10143	4695	2992	1135	27692

APPENDIX F. (continued)

2000 Adjusted Officer End Strength Year 5

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
2000	1	2216	0	0	0	0	0	2216
1999	2	2193	0	0	0	0	0	2193
1998	3	11	2150	0	0	0	0	2161
1997	4	0	2128	0	0	0	0	2128
1996	5	0	32	2044	0	0	0	2076
1995	6	0	0	1823	0	0	0	1823
1994	7	0	0	1210	0	0	0	1210
1993	8	0	0	1439	0	0	0	1439
1992	9	0	0	1602	0	0	0	1602
1991	10	0	0	1342	111	0	0	1453
1990	11	0	0	354	1015	0	0	1369
1989	12	0	0	299	1264	0	0	1563
1988	13	0	0	112	855	0	0	967
1987	14	0	0	32	732	0	0	764
1986	15	0	0	0	642	0	0	642
1985	16	0	0	0	313	24	0	336
1984	17	0	0	0	58	164	0	221
1983	18	0	0	0	97	408	0	506
1982	19	0	0	0	62	511	0	572
1981	20	0	0	0	21	403	0	424
1980	21	0	0	0	0	311	0	311
1979	22	0	0	0	0	268	5	273
1978	23	0	0	0	0	137	157	294
1977	24	0	0	0	0	96	126	222
1976	25	0	0	0	0	121	178	299
1975	26	0	0	0	0	95	140	235
1974	27	0	0	0	0	68	101	169
1973	28	0	0	0	0	22	104	125
1972	29	0	0	0	0	0	107	107
1971	30	0	0	0	0	0	74	74
1970	30+	0	0	0	0	0	55	55
	Totals	4420	4310	10257	5170	2626	1047	27829

APPENDIX F. (continued)

2001Adjusted Officer End Strength Year 6

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
2001	1	2216	0	0	0	0	0	2216
2000	2	2193	0	0	0	0	0	2193
1999	3	11	2150	0	0	0	0	2161
1998	4	0	2128	0	0	0	0	2128
1997	5	0	32	2044	0	0	0	2076
1996	6	0	0	2023	0	0	0	2023
1995	7	0	0	1458	0	0	0	1458
1994	8	0	0	1198	0	0	0	1198
1993	9	0	0	1425	0	0	0	1425
1992	10	0	0	1341	111	0	0	1452
1991	11	0	0	362	1040	0	0	1402
1990	12	0	0	240	1016	0	0	1256
1989	13	0	0	149	1138	0	0	1287
1988	14	0	0	34	770	0	0	803
1987	15	0	0	0	724	0	0	724
1986	16	0	0	0	591	45	0	636
1985	17	0	0	0	84	240	0	324
1984	18	0	0	0	39	164	0	203
1983	19	0	0	0	49	404	0	453
1982	20	0	0	0	18	357	0	376
1981	21	0	0	0	0	322	0	322
1980	22	0	0	0	0	302	6	308
1979	23	0	0	0	0	120	138	258
1978	24	0	0	0	0	109	142	251
1977	25	0	0	0	0	77	113	190
1976	26	0	0	0	0	97	143	239
1975	27	0	0	0	0	76	112	188
1974	28	0	0	0	0	54	81	135
1973	29	0	0	0	0	0	83	83
1972	30	0	0	0	0	0	86	86
1971	30+	0	0	0	0	0	59	59
	Totals	4420	4310	10275	5580	2366	963	27914

APPENDIX F. (continued)

2002 Adjusted Officer End Strength Year 7

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
2002	1	2216	0	0	0	0	0	2216
2001	2	2193	0	0	0	0	0	2193
2000	3	11	2150	0	0	0	0	2161
1999	4	0	2128	0	0	0	0	2128
1998	5	0	32	2044	0	0	0	2076
1997	6	0	0	2023	0	0	0	2023
1996	7	0	0	1619	0	0	0	1619
1995	8	0	0	1444	0	0	0	1444
1994	9	0	0	1186	0	0	0	1186
1993	10	0	0	1193	99	0	0	1291
1992	11	0	0	362	1039	0	0	1401
1991	12	0	0	246	1040	0	0	1286
1990	13	0	0	120	914	0	0	1034
1989	14	0	0	45	1024	0	0	1069
1988	15	0	0	0	762	0	0	762
1987	16	0	0	0	667	50	0	717
1986	17	0	0	0	160	454	0	614
1985	18	0	0	0	57	240	0	297
1984	19	0	0	0	20	162	0	182
1983	20	0	0	0	15	283	0	297
1982	21	0	0	0	0	286	0	286
1981	22	0	0	0	0	313	6	319
1980	23	0	0	0	0	136	155	291
1979	24	0	0	0	0	95	125	221
1978	25	0	0	0	0	87	128	215
1977	26	0	0	0	0	61	91	152
1976	27	0	0	0	0	77	114	192
1975	28	0	0	0	0	61	89	150
1974	29	0	0	0	0	0	64	64
1973	30	0	0	0	0	0	66	66
1972	30+	0	0	0	0	0	69	69
	Totals	4420	4310	10281	5796	2305	909	28021

APPENDIX F. (continued)

2003 Adjusted Officer End Strength Year 8

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
2003	1	2216	0	0	0	0	0	2216
2002	2	2193	0	0	0	0	0	2193
2001	3	11	2150	0	0	0	0	2161
2000	4	0	2128	0	0	0	0	2128
1999	5	0	32	2044	0	0	0	2076
1998	6	0	0	2023	0	0	0	2023
1997	7	0	0	1619	0	0	0	1619
1996	8	0	0	1603	0	0	0	1603
1995	9	0	0	1429	0	0	0	1429
1994	10	0	0	993	82	0	0	1075
1993	11	0	0	322	924	0	0	1246
1992	12	0	0	246	1039	0	0	1285
1991	13	0	0	123	936	0	0	1059
1990	14	0	0	36	823	0	0	859
1989	15	0	0	0	1014	0	0	1014
1988	16	0	0	0	701	53	0	754
1987	17	0	0	0	180	512	0	692
1986	18	0	0	0	108	454	0	563
1985	19	0	0	0	29	238	0	266
1984	20	0	0	0	6	114	0	119
1983	21	0	0	0	0	226	0	226
1982	22	0	0	0	0	277	6	283
1981	23	0	0	0	0	141	161	302
1980	24	0	0	0	0	108	141	249
1979	25	0	0	0	0	76	113	189
1978	26	0	0	0	0	69	103	172
1977	27	0	0	0	0	49	72	122
1976	28	0	0	0	0	62	91	153
1975	29	0	0	0	0	0	72	72
1974	30	0	0	0	0	0	52	52
1973	30+	0	0	0	0	0	53	53
	Totals	4420	4310	10437	5843	2379	863	28252

APPENDIX F. (continued)

2004 Adjusted Officer End Strength Year 9

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
2004	1	2216	0	0	0	0	0	2216
2003	2	2193	0	0	0	0	0	2193
2002	3	11	2150	0	0	0	0	2161
2001	4	0	2128	0	0	0	0	2128
2000	5	0	32	2044	0	0	0	2076
1999	6	0	0	2023	0	0	0	2023
1998	7	0	0	1619	0	0	0	1619
1997	8	0	0	1603	0	0	0	1603
1996	9	0	0	1586	0	0	0	1586
1995	10	0	0	1196	99	0	0	1295
1994	11	0	0	268	769	0	0	1037
1993	12	0	0	219	925	0	0	1143
1992	13	0	0	123	935	0	0	1058
1991	14	0	0	37	842	0	0	879
1990	15	0	0	0	814	0	0	814
1989	16	0	0	0	933	70	0	1004
1988	17	0	0	0	189	538	0	728
1987	18	0	0	0	122	512	0	634
1986	19	0	0	0	54	450	0	504
1985	20	0	0	0	9	166	0	175
1984	21	0	0	0	0	91	0	91
1983	22	0	0	0	0	220	4	224
1982	23	0	0	0	0	125	143	268
1981	24	0	0	0	0	111	146	258
1980	25	0	0	0	0	86	127	213
1979	26	0	0	0	0	61	90	151
1978	27	0	0	0	0	56	82	138
1977	28	0	0	0	0	39	58	97
1976	29	0	0	0	0	0	73	73
1975	30	0	0	0	0	0	57	57
1974	30+	0	0	0	0	0	41	41
	Totals	4420	4310	10718	5693	2525	822	28489

APPENDIX F. (continued)

2005 Adjusted Officer End Strength Year 10

Yr Gp	YCS	ENS	LTJG	LT	LCDR	CDR	CAPT	TOTAL
2005	1	2216	0	0	0	0	0	2216
2004	2	2193	0	0	0	0	0	2193
2003	3	11	2150	0	0	0	0	2161
2002	4	0	2128	0	0	0	0	2128
2001	5	0	32	2044	0	0	0	2076
2000	6	0	0	2023	0	0	0	2023
1999	7	0	0	1619	0	0	0	1619
1998	8	0	0	1603	0	0	0	1603
1997	9	0	0	1586	0	0	0	1586
1996	10	0	0	1328	110	0	0	1438
1995	11	0	0	323	927	0	0	1250
1994	12	0	0	182	770	0	0	952
1993	13	0	0	109	832	0	0	942
1992	14	0	0	37	842	0	0	879
1991	15	0	0	0	834	0	0	834
1990	16	0	0	0	750	56	0	806
1989	17	0	0	0	252	716	0	968
1988	18	0	0	0	129	539	0	667
1987	19	0	0	0	61	507	0	568
1986	20	0	0	0	16	315	0	331
1985	21	0	0	0	0	133	0	133
1984	22	0	0	0	0	88	2	90
1983	23	0	0	0	0	99	113	212
1982	24	0	0	0	0	99	130	229
1981	25	0	0	0	0	89	132	221
1980	26	0	0	0	0	69	102	170
1979	27	0	0	0	0	49	72	121
1978	28	0	0	0	0	44	66	110
1977	29	0	0	0	0	0	46	46
1976	30	0	0	0	0	0	58	58
1975	30+	0	0	0	0	0	46	46
	Totals	4420	4310	10854	5523	2803	766	28676

APPENDIX F. (continued)

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Forecasted Officer End Strength

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	3650	4087	10759	3875	3003	1445	26819
1996	4200	3551	10976	3973	3112	1368	27181
1997	4419	3557	10928	4073	3154	1299	27430
1998	4420	4091	10471	4224	3108	1255	27570
1999	4420	4307	10143	4695	2992	1135	27692
2000	4420	4310	10257	5170	2626	1047	27829
2001	4420	4310	10275	5580	2366	963	27914
2002	4420	4310	10281	5796	2305	909	28021
2003	4420	4310	10437	5843	2379	863	28252
2004	4420	4310	10718	5693	2525	822	28489
2005	4420	4310	10854	5523	2803	766	28676

Officer End Strength Costs: Pay & Allowances (000,000,000)

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT	TOTAL
1995	$132.88	$197.42	$655.78	$287.02	$269.19	$156.40	$1,698.69
1996	$155.08	$173.38	$676.57	$297.19	$281.83	$149.83	$1,733.88
1997	$167.69	$178.25	$690.97	$312.87	$293.32	$142.20	$1,785.30
1998	$173.27	$209.65	$678.87	$332.56	$296.38	$137.46	$1,828.20
1999	$177.92	$226.08	$672.63	$377.93	$291.89	$134.82	$1,881.26
2000	$182.63	$231.41	$695.85	$425.40	$262.03	$124.33	$1,921.65
2001	$188.78	$238.17	$717.66	$472.47	$243.21	$121.12	$1,981.41
2002	$188.78	$238.17	$718.11	$490.74	$236.91	$114.34	$1,987.05
2003	$188.78	$238.17	$729.00	$494.72	$244.47	$108.58	$2,003.72
2004	$188.78	$238.17	$748.58	$482.05	$259.53	$103.47	$2,020.59
2005	$188.78	$238.17	$758.10	$467.60	$288.11	$96.41	$2,037.18

Authorizations vs Forecasted Officer Strength

Year	ENSIGN	LTJG	LT	LCDR	CDR	CAPT
1995	-1425	-292	902	-1381	-588	-186
1996	-807	-664	1399	-1192	-390	-218
1997	-311	-475	1898	-894	-233	-261
1998	-61	148	1601	-644	-212	-294
1999	11	318	1186	-202	-330	-406
2000	79	318	1256	269	-692	-494
2001	79	318	1274	679	-952	-578
2002	79	318	1280	895	-1013	-632
2003	79	318	1436	942	-939	-678
2004	79	318	1717	792	-793	-719
2005	79	318	1853	622	-515	-775

END NOTES

[1]The data in the table below for "ships of the fleet" was obtained from Jane's Fighting Ships. Navy personnel strength are taken from the Bureau of Naval Personnel Statistics Annual Report for FY 95, NAVPERS 15658(A), 30 SEPT 1995.

Year	Ships of the Fleet	Year	Navy Personnel Strength
1989-90	493	1988-89	603,515
1994-95	339	1994-95	454,105

[2]See Public Law 96-515, Department of Defense Officer Personnel Management Act (DOPMA), Chapter 32, pp. 113-119.

[3]See, for example, Public Law 96-515, Department of Defense Officer Personnel Management Act (DOPMA), and Public Law 99-433, Goldwater-Nichols Department of Defense Reorganization Act of 1986.

[4]Data provided by the Analysis, Research, and Development Branch, PERS 222F1, Bureau of Naval Personnel.

[5]Data provided by the Officer Promotions Branch, PERS 212F, Bureau of Naval Personnel.

[6]Data provided by the Officer Planning Branch, PERS 212, and the Analysis, Research, and Development Branch, PERS 222F1, Bureau of Naval Personnel.

[7]Data provided by the Office of the Director of Military Personnel Management, Headquarters, Department of the Army.

[8]Data provided by the Joint Officer Manning Branch, PERS 455, Bureau of Naval Personnel and the Dean of Students, Naval War College, Newport, RI.

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